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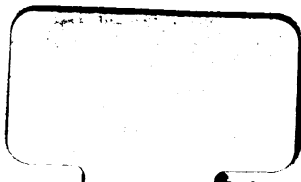
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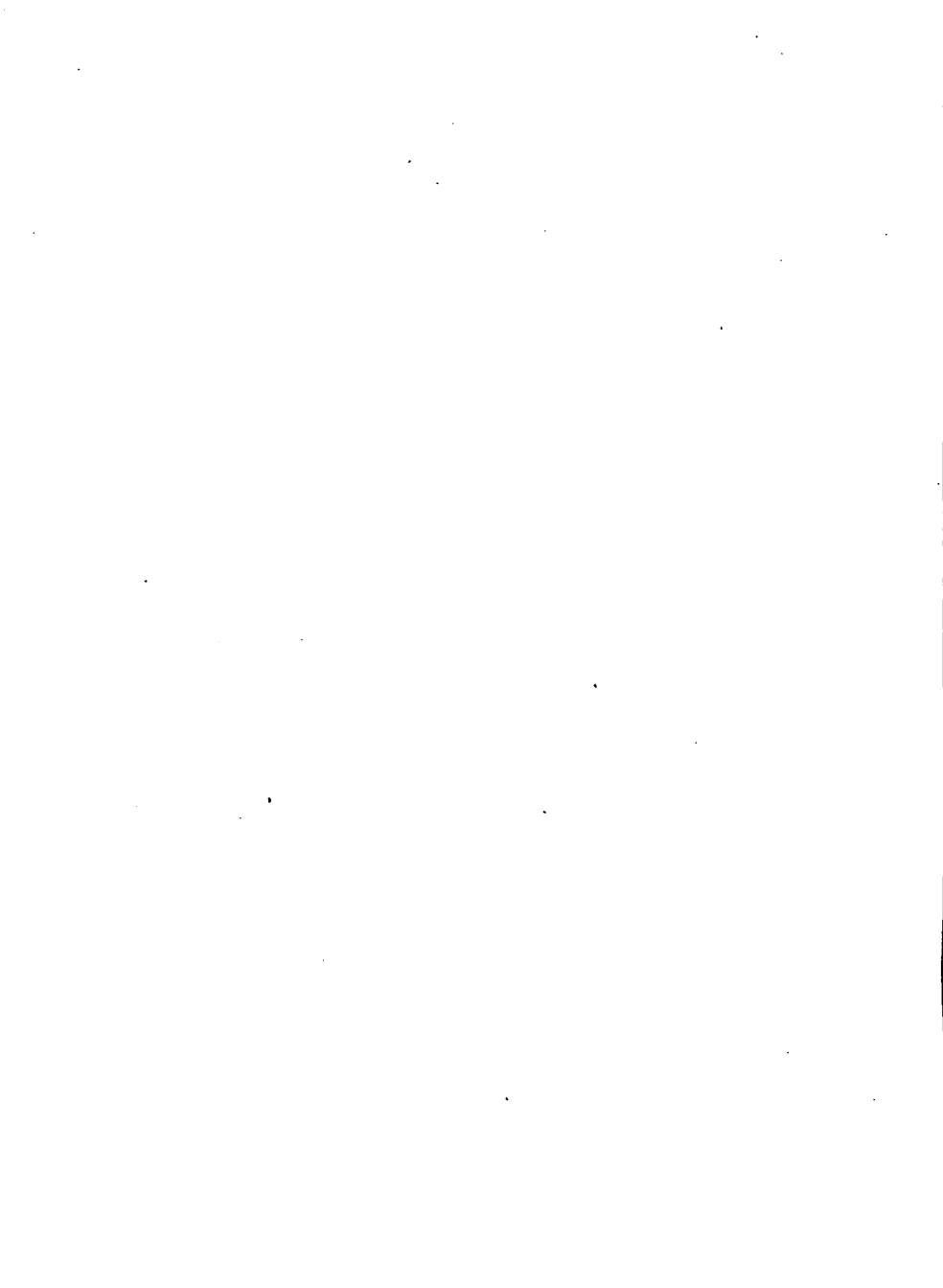
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# THE NEW ENGLAND STATES

•The M Co. •

TARR AND McMURRY GEOGRAPHIES

*SUPPLEMENTARY VOLUME*

# THE NEW ENGLAND STATES

BY

PHILIP EMERSON

PRINCIPAL OF COBBET SCHOOL, LYNN, MASS.

New York

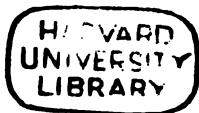
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## PREFACE

THIS Supplement is designed for use during a portion of one of the closing years of the grammar school course, and is based upon the previous books of the Series. The work accords with the Series in its causal treatment of geography and in the full presentation of more important topics. In harmony with the chapter on Industry and Commerce in the First Book on Home Geography, the social and industrial life of New England have been traced through their development from pioneer days, thus making clear the gradual action of geographic controls, and affording a vantage ground of contrast whereby present geographic conditions may be appreciated. This historical treatment of New England industries and the related consideration of all important cities has made it possible to avoid the uninteresting lists of cities and towns with their products, which comprise so large a part of many state supplements. To the same end, the communities of each state are considered collectively in the physiographic districts and industrial groups to which they belong, thus avoiding useless repetition and leaving a series of clear impressions which will abide with the pupil.

Hearty acknowledgment for valuable criticism is not only due to the authors of the Series, but also to fellow-teachers, notably Mr. W. C. Moore, instructor in geog-

raphy at the State Normal School, Salem, Mass. In addition the several sections of the Supplement have been reviewed by specialists having expert knowledge of the topic therein treated. Specially helpful suggestions were given as to Physiography by Miss E. F. Fisher, instructor in geography at Wellesley College, and by Mr. F. S. Gulliver of St. Mark's School; on Social and Industrial Development, by Mr. Henry Barrett Learned, Instructor in History in the Sheffield Scientific School of Yale University; on the Fishing Industry, by Mr. John J. Pew of Gloucester; on Lumbering, by Mr. S. W. Matthews, Commissioner of Industrial Statistics in Maine; on Agriculture, by Professor J. L. Hills, Director of the Agricultural Experiment Station of Vermont, and by Mr. G. M. Whitaker, Editor of the *New England Farmer*; on Quarrying, by Professor G. H. Perkins, State Geologist of Vermont; on Textile Manufacturing, by Principal W. W. Crosby of the Lowell Textile School and by the editors of the *Textile World*.

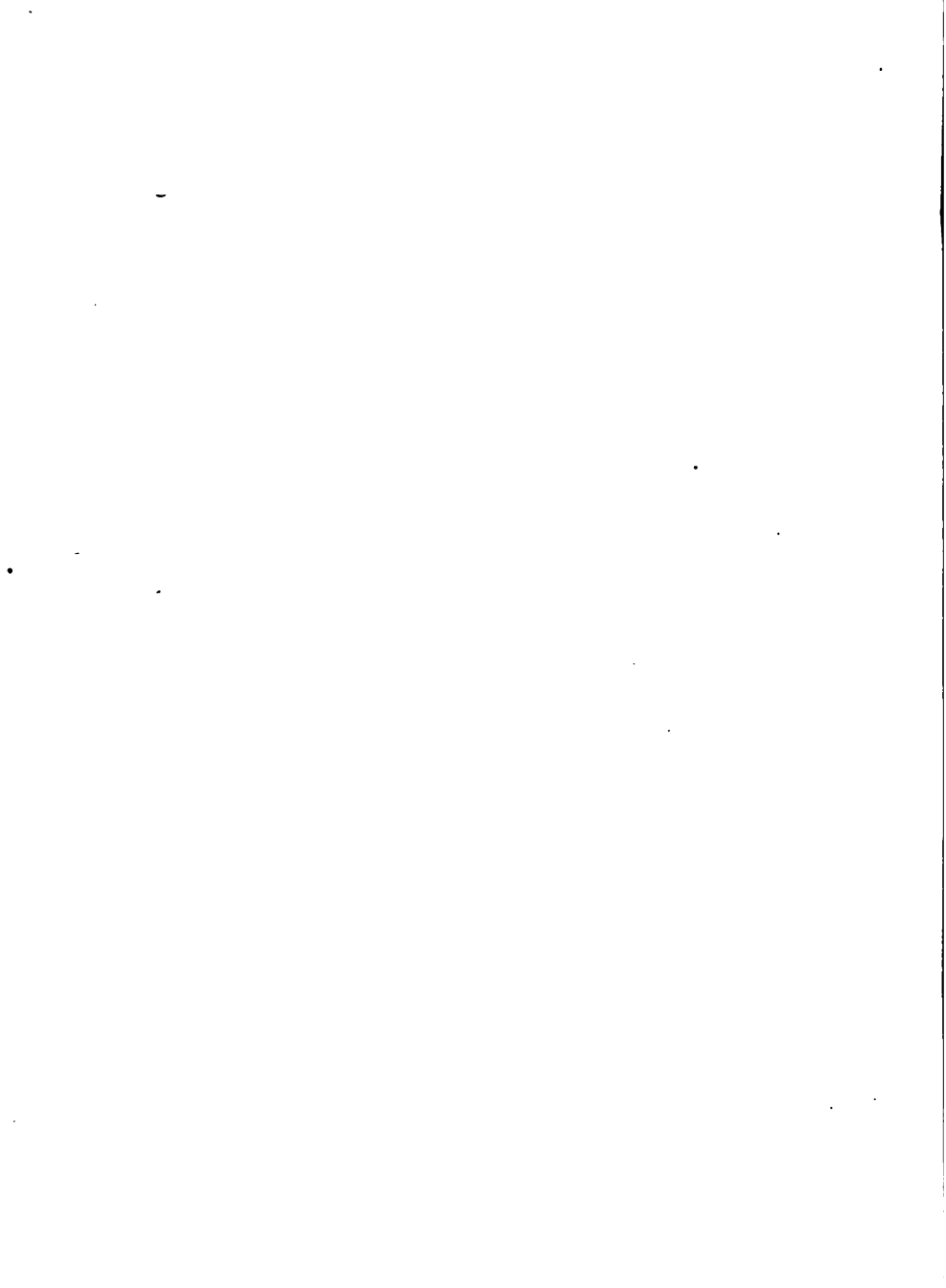
The two relief maps were drawn from the charts of the United States Geological Survey by Mr. G. E. Russell, Mr. A. B. White, and Mr. C. M. Fosdick, instructors in the Massachusetts Institute of Technology. Figures 3, 7, 11, 37, 38, 39, 45, and 47 are reproduced from photographs loaned for the purpose from the Gardner Collection at Harvard University. Photographs loaned by the Bangor & Aroostook R. R. are reproduced in Figures 24, 25, 60, and 61.

# TABLE OF CONTENTS

	PAGE
<b>PHYSIOGRAPHY</b> . . . . .	2
Position and Size, 3. Relief, 3. Glacial Forms, 7. Coast, 12.	
<b>CLIMATE</b> . . . . .	14
<b>SOCIAL AND INDUSTRIAL DEVELOPMENT</b> . . . . .	16
Settlement, 16. Early Commerce, 19. Early Manufacturing, 21. Railways, 23. City and Country, 25. Education, 30.	
<b>INDUSTRIES</b> . . . . .	33
Fishing: Development, 33; Banks Fisheries, 35; Mackerel Fishing, 37.	
Lumbering: Forest Products, 38; Logging, 39; Driving, 40; Lumber, 40; Wood Pulp and Paper, 41.	
Agriculture: Development, 43; Dairying, 44; Market Gar- dens, 46.	
Quarrying: Granite, 48.	
Textile Manufactures: Development, 49; Cotton Manufactur- ing, 51; Woollen Manufacturing, 54.	
Shoe Manufacture: Leather, 57; Development, 57; Distribu- tion, 59.	
Manufactures of Metals: Development, 60; Distribution, 60; Machinery, 61.	
Commerce: Trade Centres, 63; Boston, 63.	
<b>STATES</b> . . . . .	66
Massachusetts: Boston Basin, 67; Piedmont Belt, 70; Cape Cod, 72; Connecticut Valley, 74; Uplands and Valleys, 75.	
Rhode Island: Providence and Vicinity, 77; Narragansett Bay, 79; Uplands, 81.	

	PAGE
Connecticut : Central Lowland, 82 ; Coast, 86 ; Western Upland, 87 ; Eastern Upland, 89.	
New Hampshire : The White Mountains, 91 ; Piedmont and Merrimac Valley, 94 ; Upland and Valleys, 97.	
Vermont : Agriculture, 99 ; The Forests, 103 ; Quarries, 103 ; Cities, 105.	
Maine : Central and Eastern Maine, 107 ; Southwestern Maine, 110 ; Coast, 112.	
REVIEW QUESTIONS . . . . .	115
SUGGESTIONS . . . . .	120
APPENDIX — STATISTICS OF POPULATION . . . . .	123

# **THE NEW ENGLAND STATES**





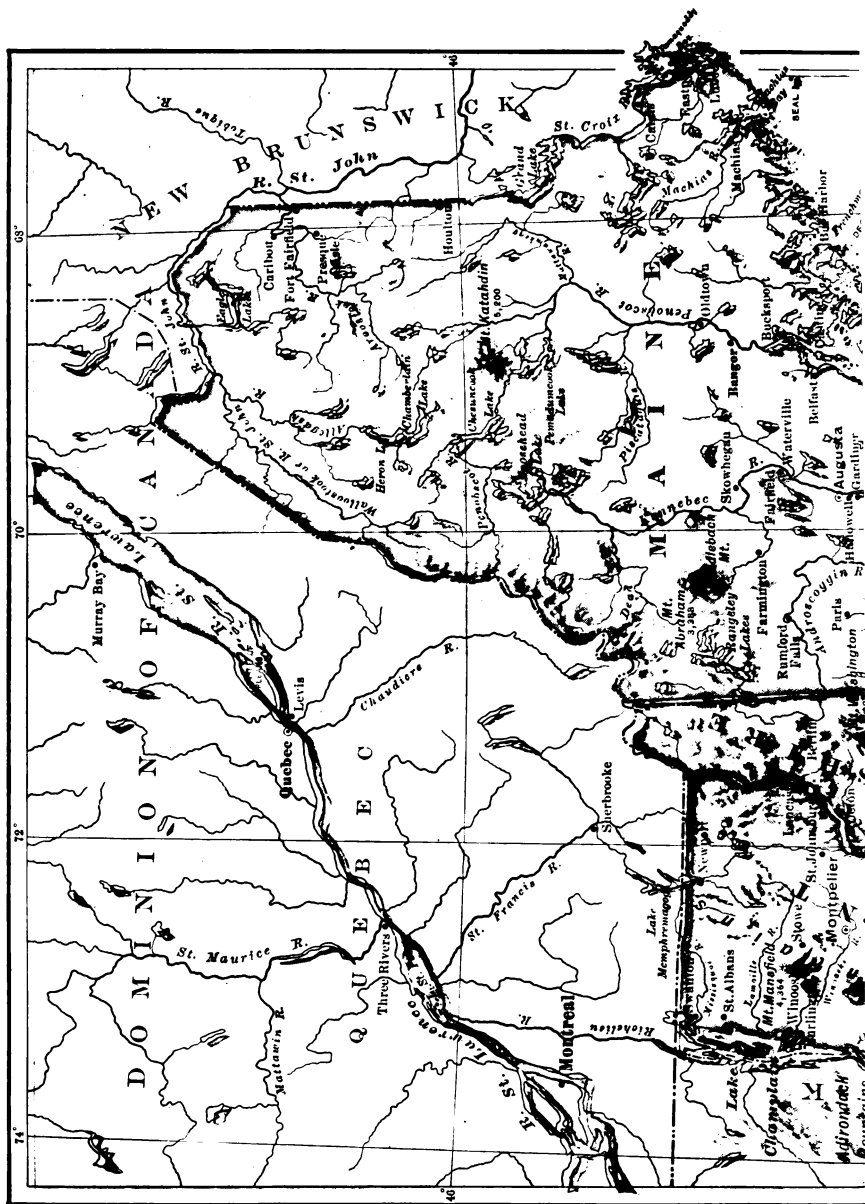
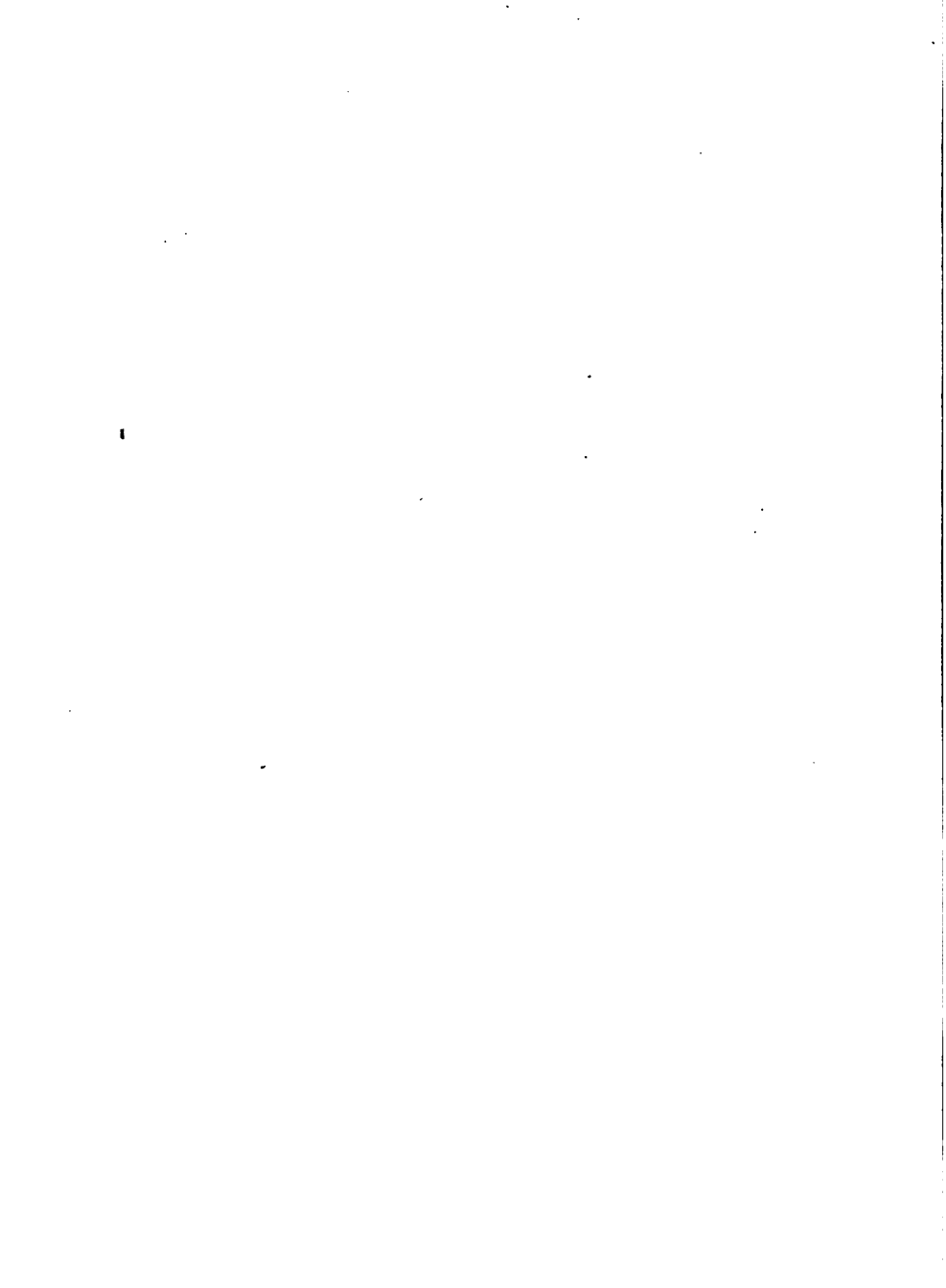






FIG. 1.



## GENERAL VIEW OF NEW ENGLAND

MAP QUESTIONS AND SUGGESTIONS.—*Political Maps.* (1) Draw an outline of North America; show the boundaries of the United States, and darken the New England States. (2) Draw a map of the North Atlantic Ocean, and indicate the course of steamers plying between New England and Europe. (3) Compare the area of the New England states with that of one of the other groups of states. Use tracing paper and draw one section within the other. (4) Compare the position of the main divide between rivers flowing to the Atlantic Ocean and to the St. Lawrence or Hudson rivers with the position of the northern boundary of New England. (5) Compare the position of this divide with that of the highest mountain peaks. (6) Indicate the general form of New England by seven straight lines. (7) Draw an outline of the New England states (Fig. 6). Omit details. Insert the state boundaries and the large rivers. (8) Draw or trace the outlines of several large lakes from the state maps. In what respect are the outlines alike?

*Relief Maps* (Figs. 2 and 49). (9) Reproduce the relief of some part of each map with chalk at the blackboard, or with a soft pencil on paper. (10) Find on the colored maps the names of the rivers, mountains, and other features shown on the relief maps. (11) Compare the relief maps with the pictures of the same districts to get a better idea of the surface form. (12) Try to describe *briefly* the arrangement of the peaks of the White Mountains. Is the arrangement regular or disorderly? (13) Where is there a long lowland in western Massachusetts and Connecticut (Fig. 2)? (14) Find rivers that flow for part of their course along narrow valleys and in part through broad valleys? (15) Where are mountains most numerous and highest? (16) Find mountains that rise from a valley? (17) Where are there mountains rising from the upland? (18) Compare the relief maps with state maps showing the railways. How has the relief influenced the course of the railways?



**FIG. 2.**  
**Western Massachusetts and Connecticut.**

## PHYSIOGRAPHY

**Position and Size.** — In the northeast corner of the United States, the older Appalachian ranges, and the Piedmont belt on their eastern base, broaden to form the New England upland. Nearer Europe than any other section of our country, its shores were those first



FIG. 3.

The Deerfield valley at Zoar. A tributary valley enters at the right.

visited by people from northern Europe, and settlements here multiplied early. Its position favors commerce with Europe. Although but about one-fiftieth of the area of the United States, New England has a fifteenth of the total population of the country, and a still larger proportion of its wealth. The study of this marked development of the land's resources by its sturdy people may well be interesting.

**Relief.** — What kind of a land is it? Travelling inland from the coast, one sees everywhere hills and valleys of

varied form; in fact, the country seems all hills. Still farther inland the main valleys are deep, and when one climbs a hill, broad tracts of rolling country are seen at about the same height as the hilltops near the rivers (Fig. 47). This upland surface often suggests a plain, in contrast with the steep-sided valleys or with the mountains that rise singly and in groups above it. Indeed, if the valleys were filled, a great rolling plain would result.

The hard crystalline rocks of this mountain-studded



FIG. 4.

View from Canada border, over Lake Memphremagog. Notice the Green Mountains rising from the upland of Vermont.

plateau and the folded and broken strata tell us that it is the remnant of ancient mountains. During long-past ages weathering and river action slowly wore away the mountain folds to a rather even surface, sloping gently to the sea. Some of the rocks, however, were too resistant to yield, and rose above the almost-plain, or *peneplain*, as rocky hills or mountains (Figs. 24 and 49). Finally, the earth's crust was gently raised, changing the low peneplain to an upland, one or two thousand feet high in the interior, sloping to the Atlantic and toward the Hudson and St. Lawrence valleys. The rivers flowed

swiftly down these slopes and slowly cut out many deep valleys. Where the rocks are easily worn, as in the Connecticut Valley below Greenfield, the valleys are broad; elsewhere they are narrow and have steep side slopes.



FIG. 5.

Looking north from above Franconia Notch (p. 93), White Mountains. Echo Lake, Profile House, and Eagle Cliff in foreground.

The elevations above the upland are irregular in form (Fig. 49) and distribution. Some, like the summits of Mt. Desert Island, rise near the coast; others, such as Mt. Monadnock in New Hampshire, rise singly from the upland. The Green Mountains extend north and south through Vermont; and a succession of peaks, of which Mt. Katahdin is the highest, crosses Maine. The White Mountains form an extensive mountainous area in New Hampshire, where Mt. Washington and some other peaks rise over a mile above sea level.

Population and industries are closely related to these divisions of upland, valleys, and mountains. In the lower, or *Piedmont belt*, near the coast, with its open, connected valleys, where

railways may easily branch, busy cities and populous towns are numerous. Inland the railways must follow the bottoms of the valleys (Figs. 3 and 47) to obtain easy grades, and many people are grouped along these lines of communication. There are scattered farms and small villages over the southern part of the

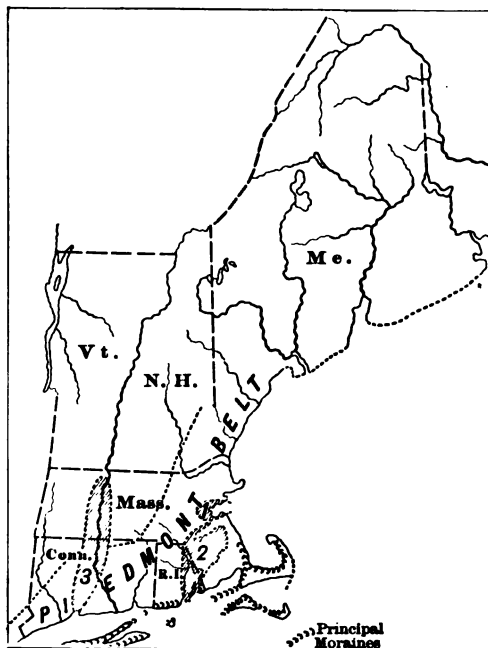


FIG. 6.

1, the Boston Basin: 2, Narragansett Basin: 3, the Connecticut valley lowland.

higher northern portion. On the mountains hardly any one lives, but large numbers visit them in summer time.

The densest population is upon a few sections where weaker rocks have been worn down to broad lowlands (Fig. 6), as about Boston, near Providence, and in the Connecticut Valley



(Fig. 2). These weaker rocks were long ago deposited as sediment in bays, formed by the sinking of the mountainous land of ancient New England. As the Chesapeake Bay is now being slowly filled, so a great depth of sediment accumulated in the ancient bays. By later uplifts these rocks were added to the land, and then were slowly worn down to lowlands.

Naturally these districts are still river basins, since their sandstones, shales, etc., are more easily worn than the hard rocks of their rims. Wherever hard lava beds or strata of conglomerate are found, they have weathered less, and therefore rise above the lowlands. Illustrations are the rocky districts in the southern part of Boston, the islands of Narragansett Bay, and the long lava ridges of the Connecticut Valley (Fig. 45), which extend southward from Mounts Tom and Holyoke.

**Glacial Forms.**—Thus far the New England upland and the Piedmont belt of the Southern States have much the same story; each is a low upland carved by valleys, dotted with old mountains, and having several lowland basins. In the Virginia Piedmont belt there are few lakes or falls, since the streams have had time to cut their valleys to a steady, gentle grade, and the river water is muddy with the clays from the deeply weathered rock. In New England, on the other hand, the surface is strewn with lakes (Fig. 4), and the beautiful, clear water of brooks and rivers goes sparkling and dancing in rapids and falls along the valleys. You have already learned that this is because northern North America was once deeply covered by a glacier, as is Greenland to-day.

As the glacier pushed slowly southward, the weathered rock was scoured away, and the hard ledges were worn to the rounded outlines which they still retain. The rock waste scoured from mountains, upland, and valleys was moved along in the ice to where the glacier ended. The

ice front long remained near the southern New England coast, and the waste that was deposited there, while the glacier moved forward and melted, formed great lines of irregular hillocks, called *moraines*. Streams from the glacier washed much sand and gravel forward and spread it out in sloping plains. Therefore Cape Cod and the islands south of New England consist of moraine hills and sandy plains sloping gently to their southern coasts (Fig. 6).



FIG. 7.

Moraine hills, Cape Cod.

North of Cape Cod the rock waste was sprinkled over the ocean floor by icebergs from the glacier front, which then stood in the open sea. Thus hard, pebbly bottoms were formed near the mainland and also on the shallow banks far offshore. On such bottoms seaweed grows well, and there is an abundance of the lower forms of animal life, which serve as food for cod, halibut, and other food-fish.

When the glacier finally retreated, all the materials in the ice, from large boulders to finest rock flour, were dropped together as *boulder clay*, or *till*, which forms the

basis of our present soil. As this soil is the mingled waste from many places, and time has not yet been given for it to decay deeply, or to be enriched by the addition of much organic matter, it is nowhere highly fertile. It is a lasting soil under cultivation, however, since its rock fragments are gradually decaying and setting free plant food.

At some distance from the main terminal moraines are regions where *till* collected in great mounds beneath the glacier, and was compacted into finely curving hills called *drumlins*. Hundreds of drumlins occur in irregular groups scattered over



FIG. 8.

Drumlin, near Ipswich, Mass.

both valleys and lower uplands; for instance, in the Boston Basin, and along the Merrimac in Massachusetts, where Whittier says, "the hills roll wave-like inland." They are also abundant near Worcester, and thence extend into Connecticut and New Hampshire. Being free from ledges, and having an even surface, many were early cleared of trees and tilled.

Streams flowing from beneath the glacier built many deltas in temporary lakes formed where the retreating glacier for a time dammed valleys. These deltas exist to-day as *sand-plains*, which are found abundantly over the lower portions of New England. Their porous soil is often marked by dry pastures or scrubby woodlands. Clay collected in beds farther from the ice front, and is to-day used for bricks. Most of the clay was deposited

in the ocean, and only in Maine has the uplift of the land been sufficient to raise these clay beds above the sea.

Moraines were also formed here and there as the glacier paused in its retreat, and its load of waste was so irregularly deposited that many valleys were dammed, thus forming most of our numerous lakes. Many of the smaller and shallower glacial ponds have been filled by stream deposits and plant growth, and are now swamps and meadows. Often the glacial deposits have turned streams from their courses over low divides. Where these streams tumble over the steeper slopes there are rapids and falls; and some streams have worn small gorges, which have an origin similar to that of the famous gorge of the Niagara River. The larger rivers remain in their former valleys for the most part, but here also there are occasional falls where the rivers have uncovered ledges, as explained below.

As the glacier retreated, the rivers were overburdened with sediment from the melting ice; and broad, sandy flood-plains were formed in the valleys, the deposits often being deep enough to cover rocky knolls. Since then the rivers have been able partly to cut away these flood-plains (Fig. 10), and as they have changed their courses from side to side, ever cutting deeper, terraces have been left to mark the different levels. Houses and roads are on the upper terraces, safe from floods, while the moister and more fertile farm lands are on the present flood-plains and lower levels. These terraced plains form the beautiful elm-dotted intervalles along New England rivers. In cutting their channels such rivers have happened on some of these buried ledges (Fig. 14), and have formed falls where the water tumbles over the rocks. Where such falls occur toward the mouths of large rivers, they afford our most valuable water power (p. 23). Why especially valuable there?

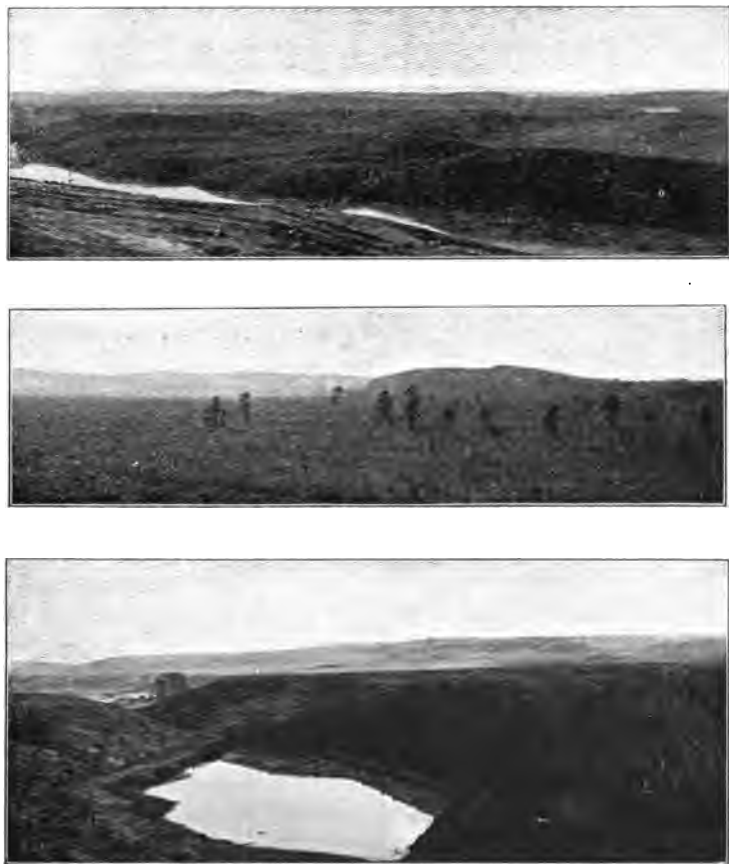


FIG. 9.

Glacial sands and gravels, now covered by the waters of the Nashua Reservoir (p. 69). The upper view shows gravel ridges formed of the coarse rock-waste deposited in the ice channels of streams flowing beneath the glacier. There are many miles of such ridges scattered over New England. The middle view shows an extensive sand-plain, once a delta. Below is pictured a little valley in the sand-plain, formed when a mass of ice that had been buried in the sand melted. Such *kettle holes* are common in sand-plains.

From the days of the first grist mill these falls have been of great importance to New England. The forests, the porous glacial soil, and the great natural reservoirs of the many lakes, all combine to hold back the water of heavy rains and deliver it in a steady flow. This water power has given a basis for the start of very important manufacturing industries. It is to-day being still further developed, and its usefulness extended by generating electricity.

**Coast.** — After the peneplain had been raised, and this upland cut by valleys to nearly its present form, the coastal



FIG. 10.

Bank of Connecticut River, Hadley, Mass. Looking toward Mt. Tom and Mt. Holyoke. The river has almost cut away the road. The lowest terrace is at the right, the broad second terrace at the centre and left.

belt was slowly depressed. This permitted the sea to cover the lower portions of the uneven land and thus form a very irregular coast line. Our harbors are simply drowned valleys, while the tide flows far inland along the larger rivers, notably the Connecticut, Penobscot, and Kennebec. The islands and peninsulas of the very irregular coast of Maine (Fig. 11) are the higher hilltops of that part of the upland.

This rugged coast has strongly influenced the industries of the section. The many good harbors have enabled the development of fishing, shipbuilding, and

commerce (p. 20); and since commerce is necessary for extensive manufacturing, the coast line has influenced that important industry also.

The waves are at work making cliffs on the headlands, while the currents carry the waste along shore to form pocket beaches in the coves, or to build bars across the shallow bays, as between Casco Bay and Cape Ann (Fig. 35). The exposed morainic sands of Cape Cod, which the waves are wearing away (Fig. 39), have supplied the sand which has been swept



FIG. 11.

Bar Harbor, Maine.

northward to build the hooked spit at Provincetown, with its drifting sand-dune hills, and southward to form Monomoy Island, a barren sandbar. In the protected lagoons, behind sandbars, and in shallow harbors along the coast, the waste has been built up into grassy salt marshes (Figs. 37 and 46).

On harborless sandbar coasts and along the dangerous reefs and winding channels of rocky shores, there are numerous lighthouses (Fig. 39) to guide the coasting schooners and other craft. The United States government also maintains life-saving stations, where men are ever on the watch during the stormy part of the year, ready to rescue lives from wrecks. The nation spends much money also in dredging harbor chan-



FIG. 12.

Life boat, Cape Cod. The wreck and line of breakers mark a shoal formed by sands swept northward from the Cape Cod cliffs.

nels to make them deep enough for modern vessels, and in making harbors of refuge where natural ports are lacking.

**SUMMARY.** — *The New England upland is an old mountain region, worn to a low plateau, or peneplain, above which mountains rise, and into which valleys have been cut, dividing much of the surface into hills. Most people live in the broad valleys near the coast. The glacier has left a stony soil, and many moraines, drumlins, and sand plains, damming the valleys with waste at many points and causing lakes and falls, which afford water power. The land has sunk, giving an irregular coast line and many harbors.*

## CLIMATE

New England is midway between the equator and the north pole, not so far north that its harbors are closed by ice in winter, nor so far south that the climate lessens the vigor of its people. Since the westerly winds bring the changing temperature of the interior, New England winters are severe; but the summers are warm enough for the growth of all the grains, fruits, and vegetables of cool



temperate lands. The early English settlers did not understand this, but expected to find mild winters in these latitudes, farther south than their homeland, where winds from over the warm ocean moderate the cold of winter. The disappointment and disaster due to the unforeseen severity of the winter season explain the failure of early settlements and the hardships of the Pilgrims.

The great extent of New England from north to south, and the contrast between the cold waters of the Labrador current north of Cape Cod and those influenced by the Gulf Stream to the south, give much variety of climate. Thus while the forested uplands near the Canada border are buried deep with snow, there is little sleighing on the lowlands near the southern coast.

Not only does New England lie on a leeward coast, with both cold and warm currents near by, but also in the usual path of the cyclonic storms from the west and occasionally of hurricanes from the West Indies. Its weather from autumn to spring is therefore disagreeably stormy and changeable. Because the lower air moves from all directions toward the centre of an area of low pressure, the passage of a storm is marked by changing winds. Southeast winds from the Gulf Stream bring winter rains as they rise over the upland. Such a wind may change to a cold "northeaster" with driving snow, — a "blizzard," strewing the coast with wrecks. As a storm passes out to sea, the prevailing northwest winds of winter bring the clear skies of a cold wave, with the mercury often well below zero on the uplands. Then the southwest winds — in advance of another area of low pressure — may change the snow of southern New England to the slush of a "January thaw." Similarly the frosts of clear nights in spring and fall occur during periods of northwest winds; and the hot spells of summer are due to the southwest winds which prevail at that season.

In summer the sun is high in the sky at noon, and the contrasts between day and night are marked. While the days



FIG. 13.

A large cumulus cloud. Compare Fig. 5.

are often intensely hot,—except near the coast, where the refreshing sea breeze is felt,—the nights are usually clear and comfortable. Cumulus clouds fleck the summer sky, forming in the forenoon when the sun has so heated the ground that the currents of heated air rise actively. Sometimes, as the clouds grow larger, afternoon thunder showers drift eastward across New England. These summer showers supplement the winter storms, and serve to distribute the rainfall through the year, thus favoring both agriculture and those manufacturing interests which depend upon water power.

The sudden and severe changes in winter make the climate of New England a difficult one for weak constitutions. Consumption has long been a scourge here. Robust people, however, are not injured by the severe climate, and it has had a share in moulding the characteristics of the Yankee.

*SUMMARY. — New England has cold winters and hot summers, because the prevailing westerlies blow from over North America. This was quite unexpected to the early settlers from England. The changing winds of passing cyclones give repeated sudden changes in the weather, both in summer and in winter.*

## SOCIAL AND INDUSTRIAL DEVELOPMENT

**Settlement.**—To understand the social and industrial life of New England to-day, we must know something of

the people who settled there, and of the development of their industries. For this purpose let us call to mind the story of the Pilgrims and Puritans, trace their extension over New England, and note the development of their simple mode of life into the complex conditions of the present century.

In the early part of the seventeenth century the cause of popular liberty seemed hopeless throughout Europe. Many people were ready to leave the rule of king and bishop in England, in order to found a new English home in North America, where they might govern both church and state as they willed.

First came the little band of Pilgrims, who, contrary to their plan of settling south of the Hudson River, were driven by autumn storms to the north of Cape Cod. So stout-hearted were they that, in spite of many deaths, the little colony remained at Plymouth, and proved that in this land of cold and stormy winters successful settlement was possible. As matters grew rapidly worse in England, the Puritan leaders secured a charter from the king to plant a colony on Massachusetts Bay. This led a large emigration hither, the first settlements being about Salem and Boston. Over twenty-five thousand people came to southern New England in ten years; but then the movement nearly ceased, because new hope arose that the contest for political freedom in England would be successful.

These settlers were all English, most of them coming from a few counties of eastern England. With the exception of a very few Scotch Presbyterians and French Huguenots, who came later, they remained for a century and a half to multiply and to possess the land without the intervention of others. No other section or country

has been thus settled by a large body of distinctively English people of the middle classes. They were the best of English blood, including many country squires and people of means and education from English towns. There were sturdy farmers, prosperous tradesmen, skilful craftsmen, hardy seamen,—and all were as thrifty and energetic as have been the best of their descendants to this day.

The movement of so many people to a land of savages, in the little ships of those times, was really wonderful; and, because of the hardships to be endured, only the more determined and vigorous left their homes. Accordingly the people of New England have been a distinct type in American life, even as the land is a distinct surface feature. Their energy, love of education, and habit of local self-government have been carried by their children westward through all the northern states to the Pacific Ocean.

The Puritans did not believe in religious freedom, and bitter disputes over religious and political matters arose at the start. This led many settlers to leave Massachusetts and found groups of towns about Hartford and New Haven, Providence and Newport, and within the colony of New Hampshire. The southern settlements were formed into the colonies of Connecticut and Rhode Island under royal charters. Maine and Plymouth were united to Massachusetts Bay Colony by the king. Thus were laid the foundations of several New England states.

Most of the early villages were scattered along the coast and along the fertile terraces of the Connecticut Valley, where they could communicate with each other by water. However, settlements were pushed inland along the valleys, until checked by the long and bloody struggle of King Philip's War. The sickness that carried off so many of the Indians between Nar-

ragansett Bay and the Penobscot River, together with the terrible destruction of the Pequots when that tribe attacked the Connecticut River settlements, opened the way to the founding of many towns. But even after the destruction of the Indians of southern New England, attacks by French and Indians from the north, during the several colonial wars, made the extension of settlements dangerous and slow. After Queen Anne's War, however, farms were pushed outward over the uplands of southern New England (Fig. 53). Thus, early in the nineteenth century the frontier had reached the Canadian border of Vermont, and the great forest belt of the White Mountains and Maine. Since then there has been little further occupation of the land, except in the valleys of Aroostook County, along the northeastern border of Maine (p. 109).

New England life changed slowly during the two pioneer centuries. The families that gathered before the great fireplaces were large, and as the children married they moved on and took up new land. Here they cleared the forest, piled the boulders into stone walls, and raised on their farms the necessities of life, including grain and meat, which are now brought from the West.

Travel was difficult over the poor roads, so every community depended on itself, and every farmer was an independent manufacturer. He built his own house, fashioned rude furniture, raised wool and flax for homespun clothing, made his own soap and candles, and in many cases made his own shoes from hides tanned with hemlock bark; in fact, he met all the necessities of shelter, food, and clothing. There was hard work for all the household, save on the day of strict Sunday rest; even the amusements were neighborhood gatherings for house-raising and corn-huskings, spinning-bees or quilting-bees. While this movement to the frontier continued, no large towns could develop, and in 1800 Boston was the only town as large as the smaller cities of Massachusetts to-day.

**Early Commerce.** — The tide of human life had hardly risen over the uplands to the mountain slopes, when it

began to recede slowly. There were lands of greater fertility in New York and the prairies beyond, and many sought new homes westward. The older towns had long passed the pioneer stage, and their growing prosperity called for goods from over the seas. This led many young men of enterprise and ability to leave the quiet, plodding life of the farm to seek the opportunities of a growing commerce in the stirring seaport towns. At every sheltered harbor, and at every river mouth, little vessels were built, for which the forests supplied abundant material; and these craft carried fish, lumber, and surplus farm products to England, southern Europe, and the West Indies. After independence was secured, trading voyages were extended to China and the East Indies; and manufactured goods and tropical products were brought home.

The farmers and villagers sent their products to the nearest ports, because only rough roads connected the harbors with interior places, and transportation was costly. Many coast towns shared the commerce, therefore, and grew rich on its profits. From the more remote uplands the farmers made annual trips, with heavily laden wagons, to the larger ports, returning with lighter loads of goods purchased from the merchants.

A century ago SALEM was the second town in New England (p. 124), with more shipping than any other port of the nation. In those days PROVIDENCE (p. 77) had a larger fleet of vessels than New York, and PORTLAND long maintained a more extensive trade with the West Indies than either Boston or New York. MIDDLETOWN was once the largest town of Connecticut; but like many places whose early commerce gave them importance, it has been outstripped by those better situated for later conditions.

As competition increased, swifter and larger vessels came into use, and New England master builders developed the type of clipper ships which surpassed in speed the vessels of other nations, and gained for the United States a large share of the carrying trade of the world. Their voyages are still a wonder, even in this day of swift steamers. The *Flying Scud*, for example, sailed five hundred miles during one favorable day.

Shipbuilding naturally became centred at a few places where the more skilful masters and workmen were located. Moreover, as ships increased in size, only the deeper harbors could be used extensively, and smaller ports declined in importance. But after the Civil War the making of iron steamships in England, and other causes, brought about a decline in wooden shipbuilding in America. The construction of barges and great four and five masted schooners at BATH and a few other Maine ports (p. 114) is now the most important form of the industry.

The increase of population in the interior demanded better means of transportation between inland towns and the seacoast than the roads afforded. Many canals were planned and two were built, one from Lowell to Boston, another from New Haven to Northampton. But the extension of canals was checked by the invention of the steam engine and the construction of railways. In time railways were built to all parts of New England, radiating from the harbors most favorably situated, and the less favorably situated ports lost their commercial importance in consequence. While coasting vessels still bring coal, building materials, etc., to many coast cities, the foreign commerce of New England at the present day is mainly carried on from Boston and from New York City.

**Early Manufacturing.** — In colonial times, England restricted the manufacture of goods in New England in order that she might compel the purchase of her own

products. But when the Revolution secured industrial freedom, New England used the wealth gained in commerce to erect other factories than the early saw and grist mills. Many hands were needed to care for the machinery,



FIG. 14.

Granite face of dam at Holyoke, one-fifth of a mile long. Notice the gate house, on the farther side, whence canals lead through Holyoke.

and thus the movement of population from the uplands to the valleys greatly increased.

The Embargo Act of 1807 and the War of 1812 checked our commerce, and the consequent lack of manufactured goods led the merchants to invest their idle capital in

manufacturing. In the years that followed, water rights were secured at the falls of our large rivers, and dams were built at great cost (Fig. 14). The abundant waters were led along the valley sides in canals, which could supply water power for rows of factories built beside them. Thus the cities of LOWELL, LAWRENCE, MANCHESTER, LEWISTON, and HOLYOKE sprang into existence.

As the use of steam power increased, many cities that were able to obtain coal cheaply by water replaced their failing commerce by manufacturing interests. SALEM, NEW BEDFORD, PROVIDENCE, NEW HAVEN, and BRIDGEPORT are prominent cities of this type. This introduction of steam aided the towns, such as HARTFORD, TAUNTON,



and HAVERHILL, that had developed at the limit of navigation on rivers. It was likewise of advantage to those whose situation, where falls occur close to tidewater, had from the first combined cheap water power and facility for importing raw materials. Illustrations of this class are AUGUSTA, BRUNSWICK, BIDDEFORD, SACO, DOVER, FALL RIVER, PAWTUCKET, and NORWICH. Other inland manufacturing cities rose to importance because of their railway connections, notably WORCESTER and SPRINGFIELD. A few railway towns, like MERIDEN and NEW BRITAIN, have become thriving cities because of the special business talent of their citizens. Make a map of New England and indicate upon it the position of these cities.

**Railways.**—The new industrial conditions, as a result of which goods were manufactured in city factories instead of in farm homes, demanded railways to bring raw materials and to remove the products to market. Therefore railways were extended inland along the valleys. The Berkshire upland was crossed by one line, and a tunnel under Hoosac Mountain made way for another line from the Deerfield valley to that of the Hoosac. Both of these, by connecting Boston with the West, have contributed largely to that city's growth. Trace (Fig. 35) the valleys followed by these two lines. Note also how the railways follow the valleys in crossing the uplands of New Hampshire and Vermont. (Fig. 54.)

Very naturally, for economy and ease of working, connecting railways were combined into through lines; and more recently competing lines have been formed into great railway systems. The Boston and Maine, in connection with the Maine Central, covers much of New England from central Massachusetts northward, connecting with Canadian roads and with the West. The New York, New Haven, and Hartford has acquired the roads of southern New England, as well as the connecting steamboat lines to New York; while the Boston and Albany

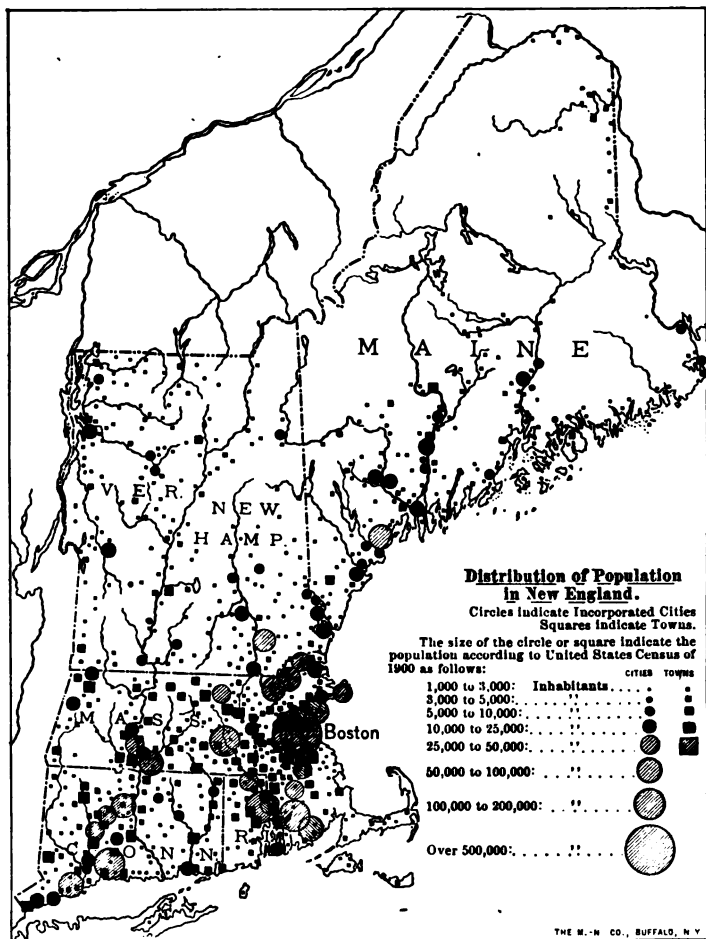


FIG. 15.

Where are the densely populated districts? In what sections are there no large towns? What is the relation of the distribution of cities and large towns to the relief? To rivers? To railways? To the seacoast? Try to discover and to state the reasons for the relations.

has become a part of the New York Central System. The Central Vermont extends to tidewater at New London; and the Grand Trunk connects Portland with Canada and the West.

This network of steel rails, spun closely over the lower coastal region and threading the interior valleys, has strongly influenced the distribution of population (Fig. 15). The interior cities of Massachusetts are along the main railway lines, and most towns not reached by rail have lost population to the gain of the manufacturing centres (p. 81).

**City and Country.** — The Puritans came in groups, and settled in villages about their churches, the better to resist Indian attacks. Later the tendency to settle on separate farmsteads increased; yet villages grew at crossroads and near saw and grist mills, because these places became centres of trade.



FIG. 16.

A deserted farmhouse, New Hampshire. Mt. Chocorua at the right. There are now many summer homes in this region.

While villages in the valleys have become prosperous towns and cities, those on the hills have stagnated. Many upland farms were too rocky and uneven for the use of farm machinery, and were so remote from railways and markets that they have proved unprofitable for tillage. Often the children left the dull life of those lonely farms for the attractions of the city, and when their parents died,

the deserted farms were allowed to grow up again to woodlands. To-day, in some districts, one may trace abandoned roads along the old stone walls, past cellar holes and chimney heaps and forgotten family graveyards. In the encroaching woodlands, apple trees and half-effaced plough furrows give indication of past thrift.



FIG. 17.

Country road, Westfield valley, western Massachusetts.

Although many farm districts are still losing population, rural conditions are brightening. Some farmers are improving their methods of work, guided by the agricultural colleges and experiment stations. Their sons find opportunities at home as well as in the cities. Better roads and the many lines of electric cars now make accessible many places that the railways have failed to reach.

As markets and social advantages are thus brought nearer to the farmer, he is made more prosperous and happy.

In pioneer days the early Indian trails gave way to bridle paths, and these to rough, ungraded cart roads. In time, because the towns could not afford good roads, companies were chartered by the states to build turnpike roads, with toll gates.



FIG. 18.

The road of Fig. 17 when changed to a state highway.

These extended in straight lines between important towns, up hill and down, and were long used by coach lines. When the turnpikes proved unprofitable to the companies, the plan was abandoned; and the ease for movement by rail led people to overlook the necessity for good roads. Even to-day many country roads are mended by scraping waste from the gutters into the road, and nearly every such road is a muddy morass in spring (Fig. 17) and deep in dust in summer.

At present some of the state governments are aiding the towns and counties to build better roads. Massachusetts has a system of state highways well under way at many different points, and Connecticut is following the same plan. New Hampshire and Vermont have taken first steps toward this end. Such state roads (Fig. 18) are built on gentle grades, of crushed stone, coarse underneath and fine above, rolled hard, and sloping to the sides in order to shed water. The roads thus made are mended with crushed stone as soon as the surface is worn, and therefore they are always in good condition both for rapid travel and for heavy loads.

Not only has the country been brought nearer to the city,—the city goes yearly to the country. It has become the custom for many to escape from the strain of city life by going away, for at least a fortnight, to gain new health by country fare and life, and to enjoy the beauty of upland views and drives. Coming at first as boarders in farmhouses and summer hotels, many families soon desired to live in their own country dwellings through the season ; so deserted farms were bought, and old buildings repaired or new ones erected (p. 94).

These estates have enlarged the field for labor in the country. The hundreds of boarders and residents who come to many towns supply a home market for the produce of even those farmers who do not take boarders, and good prices are secured for eggs, milk, vegetables, and fruit. Through this contact with the world the outlook of the country people is broadening and the value of property is increasing.

The problems of city life and government are especially difficult, partly because several races have been brought together in the cities. In the middle of the century, famine-stricken Ireland sent scores of thousands of its

people across the Atlantic. These found work in the growing cities at many kinds of labor, and gradually replaced native workmen in the mills. After the Civil War, when much help was needed to develop the rapidly growing industries, many French Canadians crossed the border under the call of rising wages. Although some returned to Canada in a few years, more have remained as citizens of our states. Other people have come from Great Britain, and from the maritime provinces of Canada; and of late Germans, Swedes, Italians, Poles, and others have come from the continent of Europe.



FIG. 19.

An alley of the North End, Boston,—a tenement district. Compare with Fig. 20.

The poverty of the immigrants has obliged many to crowd into cheap tenements in special districts. Here bar-rooms are often conspicuous resorts, vice is prevalent, and disease flourishes because of the lack of healthy outdoor life (Fig. 19). The conditions tend to separate the races and to place rich and poor apart. But active efforts are now being made by churches and other religious and charitable organizations to remedy these evils; for in-



FIG. 20.

Commonwealth Avenue, Boston. Homes of the wealthy.

stance, they send the children and sick of the poor for brief vacations in the country. A few cities have been able to close the saloons. State laws have reduced the hours of labor, and some cities have provided small parks and playgrounds in the tenement districts. In recent years cheap and rapid transit between city and suburbs has led to the growth of the outskirts of cities, where more healthful conditions prevail.

**Education.**—The school system of New England, and the free public libraries found in most towns, have been pronounced means whereby the people have developed the culture for which the section is noted. The worth of such education is clearly shown in the fact that it has increased the earning capacity of the people of New England over that of states where many children have grown up in ignorance.

Many of the Puritan settlers were well educated, and they earnestly desired the education of their children, believing



this necessary to the well-being of the state and church. Therefore schools were started early, and laws were soon passed compelling parents to see that their children learned to read, and requiring all but the smallest towns to maintain public schools. *Harvard College* was founded at CAMBRIDGE when Boston was but six years old, and *Yale College* at NEW HAVEN two-thirds of a century later. Both colleges have now become great universities (p. 70). There were grammar schools in the larger towns, where the boys studied Latin grammar in preparation for college, and other schools where boys learned the "three R's," — reading, writing, and arithmetic. The youngest children, including girls, went to private schools, kept by women, — called dame schools, — where they learned the alphabet and studied the New England Primer.

When population scattered in the second century of colonization (p. 19), the town schoolmaster had to conduct a moving school from district to district, with only a few weeks or months at any one. Every district had to erect a school-house, and later it was given its share of the town's school tax, with power to hire the teacher. During the troublous times of early colonial history interest in education had waned, and many of the small districts were too poor or too narrow minded to maintain good schools. The district schools were as a rule poorly taught, in miserable schoolhouses, with the rudest furniture and poor text-books. Most of the grammar schools were closed, but many academies were founded by the generous gifts of those who retained the desire for popular education, and the states gave their aid. Scattered over the counties, these academies afforded the opportunity for a good education to the boys and girls who could meet the expense. Several new colleges were founded, such as Brown, Dartmouth, Bowdoin, Williams, Middlebury, Amherst, and the University of Vermont, one of the earliest state colleges.

Toward the middle of the last century, through the efforts of such men as Horace Mann in Massachusetts

and Henry Barnard in Connecticut and Rhode Island, interest in education revived. The states appointed boards of education which gathered information and influenced public opinion, and in time town school committees were given charge of the district schools. State school funds were formed in order that the poorer towns might be aided, and state normal schools were founded for the special training of teachers.

The cities began to employ school superintendents to aid the committees, and to-day, in several states, groups of towns unite to secure district superintendents. When the large city schools could no longer gather in one room, they were divided into graded classes, each class having a teacher. With better roads and electric lines, even in some of the towns it has been possible to close the district school and bring all the children daily to a central building of graded schools. The academies are largely displaced by free public high schools, and far more pupils continue their studies beyond the elementary schools than formerly. Free text-books are now provided in New England, and the laws compelling school attendance are so strict that an education is insured to all.

Although some children attend private schools, the public schools help to bring the various races, the rich and the poor, together in equal preparation for a common citizenship. The schools are being adapted, also, to meet new problems. For instance, in the cities there are evening schools for the education of immigrants and those who leave school early in life for work; cooking, sewing, and manual training are taught, in order that home conditions may be improved; and summer vacation schools are held in city tenement districts, where the street is the only playground (Fig. 19).

## INDUSTRIES

**Fishing.** *Development.* — Off the coast from Cape Cod to Newfoundland there are rock-strewn banks, or shoals, where plant and animal life abounds. Here feed the cod and its allies, the haddock, pollock, and hake, and a huge flatfish, the halibut. From very early days fishermen from France have resorted hither to catch the fish, curing them on shore and returning home heavily laden. The earliest Puritan settlements on Cape Ann were made for the purpose of fishing, and the sale of fish to other peoples was the basis of colonial commerce and prosperity. On the fishing boats the boys of coast towns early gained the skill and daring which took them as young men on longer voyages. The national government formerly granted subsidies to fishing vessels, because the fisheries trained American seamen for service in the navy.

Like most industries the fisheries have become centred at a few points. Formerly every little port shared the industry, but now only abandoned fish houses and old wharves remain in many places. The population of the Maine coast and of Cape Cod has decreased with the transfer of their village fisheries to the larger ports. To-day most of the schooners that sail to the fishing banks are from GLOUCESTER (Fig. 21), and its fleets number about four hundred vessels. BOSTON, PORTLAND, and PROVINCETOWN are next in importance. The outfit for a voyage can be more easily secured, and the fish better handled, cured, and marketed now that the industry is centred. This is especially true as to marketing, since many fish are now packed in ice and shipped at once to distant cities by rail. As a market for fares of fresh fish Boston excels Gloucester, since its central position and trade connections (p. 63) favor the wholesale trade.

**FIG. 21.**

**Gloucester Harbor. Fish flakes on wharf in left foreground.**

In early times the fisherman was also a farmer in summer, and engaged in lumbering, shoemaking, or shipbuilding in winter. Naturally the methods then employed were simple and primitive. By concentrating the best thought of one enterprising port on the fishing industry it has been much improved. For instance, the fishing boats which were once rude craft, are now swift, safe, and expensive schooners (Fig. 23). Again, the skins and refuse from the salt cod, formerly thrown away, are now used for the manufacture of glue and fertilizers.

As a result of these changes, the smaller fishing towns of the peninsulas and islands, like the upland villages, find their principal occupation in serving summer visitors. Many such visitors go by rail, steamer, and yacht to almost every point on the New England coast, escaping from the heated interior to the cool, salty air of the sea breezes. Those seeking rest and change formerly went to boarding houses and hotels, but now there are also many groups of cottages along shore, some inexpensive and simple, others the palaces of the wealthy. Near the former are fleets of sloops, while costly steam yachts are common at Newport and Bar Harbor (pp. 80 and 113).

*Banks Fisheries.*—Cod and halibut, formerly caught in abundance near shore, must now be sought on the banks, far from land, where they are still numerous. An attempt is being made, however, to restore the former abundance of cod by liberating young fish near the shore. This is done by means of fish hatcheries,—established by the national government,—in which the roe or eggs are hatched and the young cared for, for a time, then placed in the sea.

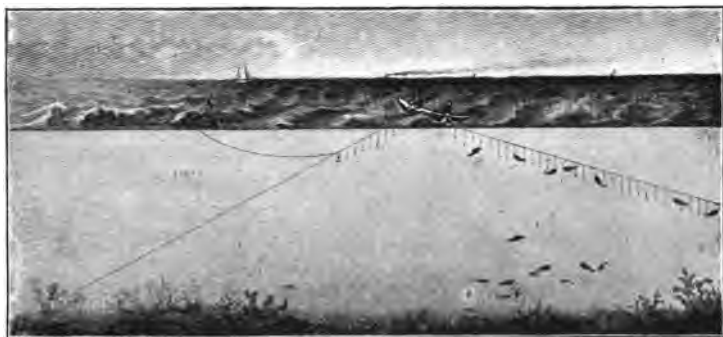


FIG. 22.

Underrunning a trawl.

Formerly all fishing was from the sides of vessels, with long hand lines. Later dories were carried on a schooner's deck, and one or two fishermen put off in each dory to fish. Many fish are still caught in these ways, but most bottom fish are now secured with *trawls* (Fig. 22). A trawl consists of short lines, with baited hooks, attached to a long ground line. Each dory is manned by two men, and has several tubs with coils of baited lines. Putting off from the schooner on the fishing grounds, one end of the ground line is anchored, and marked by a buoy; and the fishing gear is cast overboard by one man while the other rows the dory away from the vessel.

Several trawl lines are united to make a single one a mile or two in length, the other end being also anchored and marked

by a buoy. The lines remain out for a few hours, or through the night, and then the fishermen haul them into the dories and secure the fish. Where the water is not too deep, trawls for cod may be underrun; that is, the trawl is passed over the boat, the cod removed, and the hooks rebaited with pieces of fish. By this method most of the trawl is always at the bottom ready to catch fish.

On board the schooner the fish are cleaned and packed in ice, if to be sold fresh; if not, they are split, salted, and piled beneath the deck in the hold. The livers are saved for their oil, and the air bladders, which contain much gelatine, are often cut out to be sold to manufacturers of isinglass.

At the home port the fish are packed in hogsheads of strong brine. After being thoroughly soaked here they are spread on flakes — light platforms of lattice work — to be dried (Fig. 21). By this salt-drying process two-thirds of the water is removed from the fish flesh and its preservation is insured. Many of the dried cod are sent away whole, but the business of preparing boneless cod has become a very important one at the fishing ports, especially at Gloucester. For this purpose the skin and bones are removed from the fish and the flesh is then cut into short pieces or torn into fine shreds by machinery. Boxes of boneless cod may be seen at any grocery.

Most halibut are sold fresh, but some are salted on board the schooners. The salted halibut is made into smoked halibut by being hung for several days in smoke houses exposed to the smoke from fires of oak chips. Haddock are also smoked and sold under the Scotch name of finnan haddie.

Although the food on fishing schooners is abundant, varied, and well cooked, and the home life of American fishermen shares the usual comforts, a fisherman's life at sea is hard and dangerous. There he must rise early and work late and omit the Sunday rest. The light dories must often be forced against the wind when tending trawls, and must be very carefully managed in high seas. The hooks must be baited with bare hands even in icy weather. On the shoal water of the banks the waves run high during fall and winter storms,

and in some years many schooners are lost. Not uncommonly a schooner returns with flag at half mast for some of the crew swept overboard, or lost while out in the dories. While tending trawls a dory may be overwhelmed by a sudden squall, or during a fog the men may lose their bearings and drift away from the schooner and the sound of its horn.

The Gloucester fishermen do not work for wages, but the profits of a voyage are divided among the owners, captain, and crew, a small portion being set aside for the fund that provides for the widows and orphans of fishermen of that city.

#### *Mackerel Fishing.*—

Minute animals in the surface waters of the ocean serve as food for many fish, such as mackerel, herring, and menhaden. These in turn are pursued by larger fish, among which the swordfish and bluefish are most valuable for market. The mackerel disappear in winter, but come shoreward as the surface waters get warmer. Since many thousands move together in *schools*, a lookout on the mackerel schooners easily sees them as they swim along near the surface.

When a good school is sighted, the crew leap into the great seine boats, leaving the schooner to the cook, and pull away. The captain notes the direction and speed of the school, and so plans that the net is cast in a great bend in front of the mackerel, and is closed behind them as they enter. The upper side of the net is supported by cork floats, the other stretched downward by lead weights. Since it is at first open below, the school may sink and escape; but all hands straining at each end of a rope passed through pulleys along the lower edge of the net, quickly pull it together into a great pocket and the



FIG. 23.

A fishing schooner.

mackerel are entrapped. The schooner is then brought alongside, and the fish are hauled on board by a dip net. The greater number of mackerel are salted in brine, although many are carried to port as fresh mackerel.

There are other fisheries of local importance, which are considered under the separate states (pp. 73, 80, 86, and 113).



FIG. 24.

The forested upland of Maine. Mt. Katahdin.

**Lumbering.** *Forest Products.* — The forests, as well as the fisheries, were of value to the settlers in many ways; for instance, for lumber, wood ashes, and timber for ships. Many lofty veteran pines, clear, straight, and evenly tapering, were marked by the king's broad arrow and reserved for masts for the English navy. There were stirring



times when long teams of oxen hauled one, by dint of much shouting by many drivers, down to a seaport.

Much of the land is now cleared, and over the southern uplands only isolated tracts of woodland occur, which are of value mainly in supplying firewood. But in the north there is still a vast forest stretching eastward from the White Mountains (Fig. 50) and covering half of Maine. In this forest both Connecticut and Rhode Island might be placed and lost from the world and each other.

Many kinds of valuable trees abound. There are popular, birch, maple, beech, and other deciduous trees, and such evergreens as spruce, hemlock, and pine, with cedar in the swampy lands. Spruce is abundant over an upland area in Maine that is larger than all Massachusetts, and may long remain a source of great revenue if, in cutting, care is used to avoid waste and to protect young growth. The yearly cut of spruce yields a value of eighteen million dollars' worth of paper and six million dollars' worth of lumber.

*Logging.* — Before the Civil War, logging commenced only after the first snowfall, when the supplies could be drawn in on sleds across the frozen swamps. In those days also the pine logs were dragged to the river landings by slow ox teams. To-day the cutting commences in late summer, that the logs may be ready to be moved when the snow comes. Roadways are cleared, and the logs are hauled by horses to great piles in the "yards." When the chopping is over, in January, the logs are taken onto the ice of the lakes, or to the landings, whence they are rolled into the river when the ice breaks up. Food supplies for the next season are then brought in.

The beans and salt pork baked in the ground, and bread baked before an open fire, which were the food for the lumbermen in past days, are now supplemented by a more varied fare

cooked on ranges. The great log camps, however, with their rough bunks of boughs, still house the "gang" of perhaps fifty men. The life is hard and wearing, but the evenings are often made gay by songs and games.

*Driving.* — Driving, or floating the logs down stream on the spring floods, is less dangerous than formerly, being in charge of special companies on the large rivers. They have cleared away many of the boulders and sandbars against which the logs were often piled in jams, and have built dams to hold the water back for use when necessary to float the logs. A driving gang of a hundred men accompanies the logs, which enter the main stream from many lakes and tributaries. When necessary, the men leap from one rolling log to another, freeing them from jams in the quick water of rapids and pushing them onward in dead water where the current is slow. At last the logs are caught by the "booms," which are lines of logs fastened together and stretched across the rivers above the mills. Every log is marked so that those of the different owners may be separated. The several lots are distributed to the mills of different towns and cities below.

*Lumber.* — The largest sawmills are located at falls near tidewater. Why? But some which are placed beside the lumber wharves, now use steam, produced by burning sawdust. Many people are employed in manufacturing and shipping lumber, and the industry has occasioned the growth of towns and cities along the rivers of Maine; such for instance, as BANGOR, the most important lumber market in the Eastern States. While formerly the product was mainly boards, timber, clapboards, and shingles, to-day a great variety of products is manufactured, such as sashes, doors, blinds, boxes, finish, mouldings, flooring, and hardwood articles of many kinds (pp. 98, 107, and 108).

The machinery for handling the logs is greatly improved, and many devices now replace hand labor. The logs pass

from the river to the swift carriages of the bandsaws, which give a continuous cut and rapidly change logs to lumber. The boards pass to edgers and planers, then over whirling rolls to their places in the yards. The slabs are cut into laths, pickets, etc., and what remains is sold for kindling or made into wood pulp.

Much lumber is shipped in coasting schooners to Boston, New York, and other ports ; but a part of the product goes by rail from inland mills, and a smaller portion is sent to foreign ports in steamers.

*Wood Pulp and Paper.*— With the closing decades of the last century there grew a demand for more and cheaper paper than rags alone could provide, and a new use was found for forest trees. Paper was made from poplar wood, and then spruce proved better still. On the one hand, this increases the demand on the forests, and takes even the small trees ; on the other hand, crooked and seamy logs, which the lumbermen formerly left as waste, may be used for paper. The paper companies have bought large areas, where, with wise and careful cutting, the spruce may grow as fast as used.

In making wood pulp, small logs are cut into short lengths and the bark is removed by a machine. Then they are placed within the iron enclosure of a grinder and pressed hard against a revolving sandstone wheel. From this the ground-up pulp is carried off in water, and strained through sieves placed in large tanks. Thence the very thin pulp is pumped to the paper machines. In these the pulp is taken up in a thin and even layer on a broad belt of cloth which passes into and then out of the pulpy water. The water drains away slowly, and as the cloth passes between two large rolls the sheet of fibre adheres to the upper roll. As soon as a thick enough layer has collected, it is cut, stripped from the roll, and folded like so much damp blotting paper.



FIG. 25.

A grinding room in the great paper mill, Millinocket, Maine.

For making stronger and whiter paper, chemical fibre is added to the wood pulp. For making this fibre the wood is cut into very small chips and cooked for several hours in hot, acid liquor under steam pressure, until the fibre is fully separated and the pitch dissolved. Having been drained and washed, this fibre is also passed through a paper machine, so that it is easily handled and shipped.

Newspaper stock is usually made from wood pulp. For book and magazine paper much chemical fibre is added to the wood pulp, the two being well mixed in water and again passed through a paper machine of many rolls.

The paper industry is an important one in northern New England. Sawmills run only about half the year, while the pulp and paper mills employ more workmen and keep them ever busy. The mills are all on the large rivers, where the logs are floated down to them, and where cheap power to run the grinders is available at the falls. Many cities and towns on the Penobscot, Kennebec, and Androscoggin in Maine have large pulp and paper mills (pp. 108 and 112). By the development of this industry, BERLIN, on the falls of the Androscoggin in New Hampshire, became a city in a few years.

**Agriculture.** *Development.*—Agriculture was for two centuries the leading occupation of New England, for the other industries were carried on only at odd times by those who were engaged in farming during much of the year. This same condition exists to-day in a number of places. For example, lime casks are made by farmers who live in towns near ROCKLAND, Maine, where much lime is produced (p. 115); and salmon are caught in weirs by those whose farms border the lower Penobscot. Nevertheless, although the soil of most of the newly cleared land was so rich with leaf mould as to give the pioneers good grain crops, the uplands are too rocky and uneven to be tilled easily with machines. Therefore New England now depends upon the Central States for food staples.

With the growth of cities and railways New England farms have greatly changed. Formerly their products were so varied as to meet most of the needs of their owners, and some farmers still keep a half dozen kinds of farm animals and cultivate small areas of many orchard, field, and garden crops. In common with the tendency in all industries, however, a progressive farmer to-day gives his main attention to some one class of products. For example, there are stock farms which rear thoroughbred cattle or horses, and poultry farms that produce eggs and chickens for market. In Aroostook County, Maine, thousands of acres of potatoes are planted (p. 110). In early fall many people on Cape Cod are busy picking cranberries, cultivated in the bogs that have formed in depressions of the glacial sands. On the terraces of the Connecticut valley there are fields of tobacco (p. 83). Near the cities there are many hothouses for raising flowers, to meet the increasing demands of wealth and culture.

The ready market in the cities for milk, fresh vegetables, and fruit has given the dairy and market-garden industries the leading place in New England farming. Like all well-watered, hilly districts, our uplands are grass grown and fitted for dairy farms. Market gardening does not require extensive areas, and brings returns so large as to warrant thorough cultivation of the soil, even though it be light and loose.



FIG. 26.

A poultry farm.

*Dairying.* — In early days the cows were milked only when out at pasture, and they simply lived through the winter with but scanty food. They were of no certain breed, and were as highly valued for meat as for milk. Only half a century ago drovers travelled through New England buying cows and oxen, and drove them in herds to Boston, there to be killed for market.

To-day the dairy cow (Fig. 27) is a milk machine, as highly developed a product of human skill as a loom. Cows have been imported from parts of Europe, where they have long been carefully bred, and the breeding of stock has been continued here so as to secure animals that should turn their food into a large yield of rich milk, instead of placing it in flesh and fat upon their bodies (p. 100). The herds of Jerseys, Holsteins, and other breeds supply milk throughout the year, for in winter they are housed in good barns and provided with varied and nourishing foods.



FIG. 27.

Stoke Pogis Regina, — a valuable Vermont Jersey cow.

Largely because of the dairy business hay is far the most important crop raised on New England farms. The land is manured yearly, and every few years it is ploughed and sown with grass seed. Besides well-cured hay, — and more concentrated foods from corn, oats, and cotton seed, — green food or ensilage is fed. For this the green corn stalks and ears are cut up into bits which are packed closely within the walls of a silo away from the air. Although some fermentation takes place, the ensilage retains the food value of the corn and is liked by the cows.

Many farmers near the large towns and cities make a business of selling milk. In the evening the milk from

several farms is collected, poured into a large mixer, and then put into cans and glass bottles. Early the following morning the milk is delivered to the customers in the city.

Boston requires so much milk that its supply must be brought from a distance by train. Four large firms, which contract with the farmers for milk, run trains from southern New Hampshire and central Massachusetts. Milk delivered in the morning at the railway station reaches the contractors at noon, and is sold from their depots to the milkmen, who deliver it the next day. This milk, although a day or more old when delivered, has been kept sweet on ice. Inspectors acting under a state law see that it is not weak or adulterated. When too much milk is received, the contractors make the surplus into butter. Cream is also sold, and much of this comes from creameries in Maine. A milk train from Pittsfield takes milk from many towns to New York City daily.

At a distance from populous districts, most of the milk is used in the manufacture of butter and cheese, which may be transported long distances with profit. Creameries and cheese factories are more abundant in Vermont (p. 102) than elsewhere in New England.

*Market Gardens.* — When truck farmers in the Southern States commenced to send their products north, the raising of vegetables near the northern cities developed into a special industry to meet this competition. The work of the market gardener continues through all seasons. The large growers have glass houses, heated by steam or hot water, in which cucumbers, lettuce, and radishes are raised in the winter, and tomatoes in the spring. The hothouses near Boston are very extensive (p. 69), and their produce finds sale even in New York.

After the last fall crops have been gathered, long trenches are dug on some sunny slope and filled with deep beds of fresh



manure covered with several inches of loam. These are protected from north winds by a high board fence; while sashes of glass, thick mats, and board shutters, resting one above the other, protect the beds from the cold air. The decomposition of the manure produces heat, and the seeds sown in the loam germinate. On sunny days the mats and shutters are taken from the glass. Radishes, dandelions, and cucumbers are raised in hotbeds in spring, and many kinds of plants are started in them to be later transplanted.

Several crops a year are often raised from a field. The land is ploughed, manured, ploughed again, harrowed, and raked before each crop, thus giving little chance for weeds. Planting, cultivating, weeding, watering, and gathering the crops give employment to many hands throughout the summer. The products are taken to the cities and, like milk, are sold to large firms or directly to customers.

Crops that require little skill are commonly grown by the farmers throughout New England. Potatoes and cabbages are illustrations. In Maine much sweet corn is raised for the canning factories scattered through the towns (p. 112). In addition to the common vegetables, the market gardens raise celery, green peas, cauliflower, and other products which require trained care while growing, or which must be marketed at once when mature. Celery, onions, and such root crops as turnips and parsnips are stored in cemented cellars for sale in winter after the surplus from the farms has been marketed and the prices are higher. The market gardeners also raise strawberries, raspberries, blackberries, and other small fruits. Some places have large orchards of peaches and pears, and apples are extensively grown. Maine exports many apples.

Because the very best fruit and vegetables secure a ready market at high prices there are special seed farms. The owners grow seed carefully for sale, and strive to

develop varieties that shall mature early or late, and yield fairer, larger, and better keeping products (p. 83).

**Quarrying.**—New England is an old, deeply worn mountain land, whose weathered surface rock has been rasped away by the glacier that once covered it. The many exposed ledges of hard rock hinder farming, but supply valuable building and road-making material. The growth of cities has increased the demand for stone, and quarrying has become an important industry. Some kinds of stone deserve special mention. Sandstones are quarried in the Connecticut lowland. The marble quarries about RUTLAND, Vermont, are the most important in the country (p. 104). An abundance of lime of the best quality is burned in and near ROCKLAND, Maine (p. 114). Granite, however, is quarried in each state extensively.

**Granite.**—Granite forms the main mass of many New England mountains, because of its strength, hardness, and resistance to weathering. The same qualities make it valuable both for building stone and street-paving blocks. The varying colors of different granites and the enduring beauty of their polished surfaces have led to the use of the stone in the interior of buildings and for monuments in cemeteries, although it is not so easily and cheaply worked as marble or slate (p. 108).

Granite is so hard that it must be fashioned for use largely by means of the chisel and hammer. The granite blocks are separated by blasting or by wedges driven into holes made by drills. These great blocks are further divided into desired sizes in the latter way and are placed by derricks on platform cars for removal. The granite slabs are split and trimmed to the size for paving blocks by the skilful use of hammers; but for shaping blocks for buildings and monuments the use

of chisel and hammer is now supplemented by a power drill. This is held and directed by the hand, and strikes swift blows against the stone by the force of compressed air.

The drowning of the coast has brought granite ledges next to the water in many places, as on the Maine coast (p. 114) and at Cape Ann. From such places paving blocks and building stone may be cheaply conveyed in vessels to the great coast cities. Granite is also quarried at many inland points, as near CONCORD, New Hampshire (p. 98). The granites of QUINCY, Massachusetts, and WESTERLY, Rhode Island, have long been quarried. Recently the quarries about BARRE, Vermont, have been developed rapidly, until now the granite business is of immense importance there (p. 105).

**Textile Manufactures.** *Development.* — Fish and lumber were the basis for a commerce that enriched the coast towns of New England and supplied them with foreign manufactures; but agriculture yielded no staple product so freely that much of it could be sold abroad. The cold winters required warm clothing, however, and gave leisure for its manufacture; so the farmers raised flax and kept flocks of sheep to provide materials for their "linsey-woolsey" suits. The sheep were washed and their fleeces sheared by the men, while the women prepared the tangled wool for spinning by combing it with hand cards, which were rude brushes with wire teeth.

Perhaps you have seen an old spinning-wheel by whose swiftly turning spindle much fibre has been twisted into yarn, or spun, as the wool was slowly drawn out to the right size between thumb and finger. During the long winter evenings the homespun cloth was woven on rude hand looms. This was then "fulled," that is, soaped and worked with the hands

until the fibres were loosened and matted together, making the cloth thick and warm.

There was never cloth enough made in the colonies to supply their needs, although laws were enacted to encourage its manufacture. Sheep were free from taxation; bounties were given for wolves killed; and the dog tax that we still pay was imposed then, because dogs often killed sheep. The colonies required that children should be taught to spin, and that each family should spin its yearly share of yarn.



FIG. 28.

A spinning room in a textile factory.

In the second century of colonial times, mills where the farmers could have their wool carded and their cloth fulled became common. A few still remain in remote districts of northern New England. There were skilled weavers in some villages, who wove cloth to order from yarn supplied them, while others went from house to house plying their trade.

Although the Revolution removed the restrictions imposed by England on the manufacture of cloth for sale, the industry developed very slowly. In the latter part of the eighteenth century many inventions were made in England whereby cotton or wool could be cheaply and rapidly spun on machines bearing many spindles and driven by water power. Soon power looms replaced hand looms. As English law strictly forbade

the exportation of textile machinery, or any drawings or descriptions of the machines, the small American factories that were started could not make cloth as cheaply as it was imported. However, eager to profit by the opportunity, several skilful English mechanics came to this country near the opening of the last century and built spinning and weaving machines like those familiar to them. The War of 1812 followed, and prevented the importation of cloth, and this encouraged many factories to start. Later the tariff protected



FIG. 29.

Manville, a factory village of Rhode Island. What does the picture show ?

American factories from English competition. Since then, American invention has so improved textile machinery that in some lines it is superior to foreign patterns, and American cloths are sold in the markets of the world.

*Cotton Manufacturing.* — Cotton manufacturing was never a household industry in New England, since little cotton was produced in America before the invention of the cotton gin in 1793. Its successful manufacture here dates from the coming of Samuel Slater from England in 1790. With the aid of PAWTUCKET capitalists he made machinery and started successful mills in Rhode Island.

Young men who had been trained with him established mills of their own at the many falls of the Blackstone, Pawtuxet, and Quinebaug rivers (pp. 79 and 90). They started with small mills, and gave close attention to the work, so that fine grades of yarn were produced and some mills made a specialty of certain kinds of cloth. These characteristics are still true of that section (Fig. 29).

When the War of 1812 checked commerce, Boston merchants invested their money in manufacturing. A mill at WALTHAM proved successful, and later, Boston capital built dams and mills at LOWELL, MANCHESTER, LAWRENCE, NASHUA, BIDEFORD, and LEWISTON. To secure

operatives for the large mills erected, the corporations built boarding houses and placed them in charge of worthy people so that parents in country towns might safely allow their daughters to enter the mills. Excellent hands were thus obtained, and although the hours of work were long, the operatives were treated considerably and well paid. Since then conditions have changed.

Immigrants have largely



FIG. 30.

Relative importance of cities and water-powers in cotton manufacturing.

replaced native workmen, and both parents and their older children are now employed in the mills (p. 29). State

laws have shortened the hours of labor and have protected the interests of the employees in other ways.

FALL RIVER, the "Cotton City" of America, is an illustration of cities where local capital has developed the industry. The water from ponds on the upland rim of the Narragansett Basin here descends in falls to tide level, and cotton mills were built early in the last century. The moist climate, due to the neighboring ocean, favored cotton spinning. The money gained in the first mills was invested in others driven by steam power, and Fall River became the leading cotton-manufacturing city of the country. The corporations erected tenements rather than boarding houses, and the operatives have from the first been a somewhat permanent class. Cotton manufacture in NEW BEDFORD and TAUNTON has had a similar history. ADAMS and NORTH ADAMS form an inland centre of independent development where cotton mills have multiplied.

Plain sheetings and shirtings have always been the most common product of the mills, although nearly as much print cloth is woven. This print cloth, for calico, is printed in colors with engraved rolls, somewhat as paper is printed by a rotary printing press. For other goods, such as gingham, the yarn is dyed, and is then woven in stripes or checks. With the growth of cotton mills through the Southern States, where the coarser yarns and cloth are produced near the cotton fields, New England manufacturers began to turn their attention more and more to the finer grades of cloth and to the mixtures of cotton with wool or silk which were formerly imported. In order that this industry may be further improved, textile schools, which thoroughly train young men in all its branches, have been established by the aid of the state of Massachusetts at LOWELL, NEW BEDFORD, and FALL RIVER.

Sharp competition has compelled constant effort to cheapen the cost of manufacture, for every mill has striven to undersell

others and thus to secure a larger market. Sometimes this has led to the reduction of wages, and then strikes, disastrous both to owners and operatives, have followed. With the progress of invention it has been necessary, even at great cost, to discard old machines for swifter and better ones, for without the best machinery a mill cannot compete in production. Thus small mills have given way to larger mills because in the larger mills cloth is made more economically. There are now fewer cotton mills than a half century ago, yet more cotton cloth is produced.

*Woollen Manufacturing.* — Woollen mills are smaller than cotton mills and more widely scattered, many being in towns along the smaller rivers. This is natural, since they were developed from the many fulling and carding mills that added machines for spinning and weaving (p. 50). At the time when communication was difficult, the abundant small water powers were of much value for supplying local needs. Berkshire, where many sheep were formerly raised, was then the leading county of Massachusetts for woollen factories. PITTSFIELD is still a centre for woollens.

After a tariff was placed on worsted cloth, during the Civil War, its manufacture developed in America. Like cotton manufacturing, it is centred in the large mills of cities, because when first started it was necessary to import complicated and costly machinery and to bring skilled workmen from abroad. The mills of PROVIDENCE lead in worsted manufacture; but worsted goods are produced extensively in LAWRENCE, LOWELL, MANCHESTER, WOONSOCKET, and FITCHBURG. Their manufacture is being started in smaller places since worsted machinery is now made in Lowell.

After the wool has been carefully sorted into different grades, it is washed and passed through the bur picker, whence



it is blown as light flecks of clean fibre, ready for bleaching and dyeing. If intended for woollen cloth, the wool is passed through three carding machines, and is then spun into a loose, weak, fuzzy yarn of tangled fibres. Cloth is loosely woven from this, and fullled to close the meshes. For worsted cloth the wool is of a grade which does not need cleaning in a bur picker. A delicate machine called a comb removes all short fibre, and lays the long fibres parallel. Then a strong, closely twisted, smooth, hard yarn is spun, and this is closely woven into a cloth with a hard surface that needs no fulling.

In America textile mills have usually performed all the many processes necessary to change the cotton and wool to cloth ready for use. In England separate mills do the spinning, weaving, dyeing, and finishing, for the reason that each process was a separate trade before factories were built. This system has also been adopted in New England to some extent. Thus, there are mills which spin yarn for sale to mills that do not produce enough for their own looms; and while some cotton mills finish their own cloth, others send their sheetings to bleacheries. In a few textile cities there are mills which do nothing but dye, print, or finish cloth for others.

The manufacture of woollen carpets is important in America, where the prosperity of the people causes a large demand for floor coverings. Although the mills of New England manufacture but a fifth of the carpets made in the United States, and the great centre of carpet weaving is at Philadelphia, carpet looms which have proved the best in the world were invented in Massachusetts. The carpet mill at CLINTON is the largest in the world, and there are other large mills located at LOWELL, at BOSTON, at WORCESTER, and at Thompsonville, a village north of Hartford. These mills produce most of the more costly carpets made in the country, such as Axminsters and Wiltons, also tapestry Brussels.

There are many lesser phases of textile manufactures. The difficult task of making strong cotton thread for sewing machines was first accomplished in America at WILLIMANTIC. Now well-known brands are also made at HOLYOKE, where the great water power (Fig. 14) is used both by cotton and woollen mills. Although flax is no longer grown in New England, it is imported for a few mills that make linen shoe thread and twines, or that weave towels and other coarse linens. Many



FIG. 31.

Looms, the Arlington Mills, Methuen, Mass.

mills in New England are engaged in the knitting of underwear, hosiery, and gloves. Some are in the Merrimac valley, from LOWELL north to LACONIA. American silk manufacture (p. 91) centres at Paterson, New Jersey, but much silk cloth is also woven at the large mills in SOUTH MANCHESTER, near Hartford. The greater part of the American sewing and machine silk, and floss and embroidery silks is made in New England, the largest mills being at NORTHAMPTON.

**Shoe Manufacture. Leather.** — There were tanners and shoemakers among the early colonists. In nearly every town there was once a tannery, where the hides taken from the cattle killed for food were converted into leather. The hides lay for months in the tan vats, soaking in water which was full of tannin obtained from hemlock bark. This changed the hides to tough leather which would not decay. When soft leather was needed, the thinner hides were also oiled and worked until pliable (Fig. 32).

Since it is cheaper to take the hides to the forests than to transport the bark, the New England tanneries of sole leather are now among the hemlock forests of eastern Maine. Much sole leather is tanned in the Central States with oak bark. Light upper leather, which requires less tannin in its manufacture but more skill, is made near the leather market of Boston, at PEABODY, SALEM, LYNN, and WOBURN. In place of tannic acid from bark, chemical baths are now used to tan morocco and similar leathers.

**Development.** — When not busy with farm work, the early shoemakers made shoes for their neighbors, or went from house to house plying their craft. Seated on a low bench, the lone workman cut, sewed, and hammered with rude tools like those used a thousand years before in Europe. Pieces of thin leather were cut out and sewed together to form the upper; this was turned inside out, fitted over the wooden last, or model of the foot, and tacked to the thick sole. The shoe was held on the knee by a strap passing under the foot while the upper and sole were sewed together. An awl was used to make a path through the pieces of stout leather for the slender needles. The shoe was turned right side out when sewed, again placed on the last, and, while held on the lapstone, pieces of heavy leather were tacked or pegged to the sole to form the tap and heel. Paste was used to attach a smooth inner sole, and blacking served to color the edges, which were then polished.

The steps in the process of shoemaking are much the same to-day, but there has been a wonderful change in the tools used. Once a pair of shoes was a day's work; now they may be made in twenty minutes or less.

Shoes were made near Boston in early colonial times, and the success of the industry led expert shoemakers to come from England. Some who were skilled in making ladies' shoes settled at Lynn; others established the making of



FIG. 32.

A tannery at Lowell. Glazing calfskins.

men's shoes in towns south of Boston. Each section has ever since maintained its specialty. Master shoemakers had tiny shops where two or three workmen aided them in making up lots of shoes, which were afterwards carried to Boston for sale. At a somewhat later time it was the custom to fit up large central rooms for cutting the leather into all the necessary parts for shoes. These were then made into bundles which were given out to surrounding shops, or sent to the country towns of eastern Massachusetts, and even into Maine. In the homes the uppers were sewed by women and the heavy work on the soles was done by men. The finished shoes were then

returned to the cutting rooms ready for sale. This system lasted until about 1860, and in the making of hand-sewed shoes it is still preserved in a measure.

The workmen in these shops were of marked intelligence, and work was often accompanied by the reading aloud of the newspaper and the discussion of political issues. Shoemaking was confined to native workmen much longer than other manufacturing industries.

When the sewing machine was invented, the stitching of the uppers was transferred to the same building as the cutting room. Then came a machine which could sew on the sole, and the shoe factory replaced the little shoe shops. Machines have been added to perform every step of the work, excepting the cutting of the parts of the upper, where expert judgment is needed to cut the leather to the best advantage. American men and machines make better and cheaper shoes than are made in other countries, and American shoes and shoe machinery are now exported.

*Distribution.* — The early factories were small and some were scattered through the districts where shoes had been made under the old system. When strikes resulting from the introduction of new machinery or from questions of wages became frequent at the centres of shoe manufacturing, some manufacturers removed to country towns (p. 95) in the hope of avoiding labor troubles.

To-day the tendency is to close the small and scattered factories, and to concentrate the business in large plants in the leading shoe cities. Although there are shoe factories in some one hundred and fifty towns of Massachusetts, New Hampshire, and Maine, and a few in each of the other New England States, two-thirds of the production comes from the cities of LYNN, BROCKTON, and HAVERHILL, and the cities and towns near them. Many large firms make special shoes which they widely advertise.

Since the discovery by Goodyear that rubber may be vulcanized, — that is, heated in combination with sulphur so as to remain hard and durable in use, — it has been made into a variety of articles and fabrics in New England factories. Many rubber overshoes and boots are made in southern New England; for instance, at MALDEN and CHELSEA, near Boston.

**Manufactures of Metals.** *Development.* — It is a surprising fact that Massachusetts was for a hundred years the chief seat of American iron manufacture, and mined its own ores. The water soaking through the glacial soil dissolved much iron, and this collected in rusty deposits in many springs, ponds, and swamps. In many sections this inferior bog iron ore may still be dug from swamps or dredged from the pond bottoms. Groups of farmers established rude forges where the ore was melted with charcoal fires, and either cast into such articles as kettles and cannon, or roughly hammered into bar iron. In many a farmer's chimney corner was a little forge which was kept busy during the evenings while father and sons hammered out nails from bar iron.

During the second century of colonization richer ores were opened up in western Massachusetts and Connecticut, and pig iron, good enough to be used for edged tools, was produced in furnaces. Though the iron for the *Monitor* came from near Mt. Greylock in Massachusetts, the development of richer mines in Pennsylvania and the West long ago led to the closing of most of the iron mines in New England (p. 88). Mills for rolling iron bars and plates from pig iron have also failed in competition with mills nearer the mines of Pennsylvania.

*Distribution.* — New England still has extensive manufactures of metals, and these are in part outgrowths of the

early industry. For instance, iron ore was formerly mined at Brandon, Vermont, and the casting of car wheels has been continued at RUTLAND, although the pig iron now comes from outside the state. While most nails are now made near the iron mines, over half the tacks of the country are still manufactured at TAUNTON and thereabouts. Stove foundries were early established to meet a need of the climate, and they still flourish.

In general, New England iron and steel manufactures are such as require little metal, but much skilled labor and exact machinery. Fine tools of the best quality and finish are made in many places. The largest screw factory in the world is in PROVIDENCE. There is a great wire mill in WORCESTER. In the factories of many Connecticut cities and towns small articles in hardware for buildings, carriages, and other uses are produced (p. 84). Much electrical machinery is made in LYNN. There are great scale works at ST. JOHNSBURY and at RUTLAND in Vermont.

Brass work of all kinds is made in the cities of western Connecticut, notably at WATERBURY (p. 89). The extensive manufacture of jewellery and silverware, especially in and near PROVIDENCE, has developed from the early invention and application there of a method of gold plating. Yankee ingenuity constructed wooden clocks in colonial times, and now American-made watches, from WALTHAM, WATERBURY, and elsewhere, have won world-wide fame both for cheapness and for value as time-keepers.

*Machinery.* — Machinery is the most important of the New England manufactures of metals, and machine shops are to be found in every manufacturing city. Because the manufacture of textiles, shoes, paper, and other goods developed here, machine shops where the ideas of the

inventors took form are also found. For instance, the best of textile looms are of New England invention, and there are great loom works at WORCESTER. In fact, this city, so centrally located, is a great machine shop for supplying the needs of the cities round about. In general, the larger the city, the more machinery made there; hence the factories of Boston naturally produce the most.



FIG. 33.

A machine shop. Making shuttles for sewing machines.

Vehicles of all kinds are made in New England. The coaches and wagons of CONCORD, New Hampshire, were famous long ago; and the carriages of AMESBURY, Massachusetts, are also widely known. Bicycles are manufactured at many points, notably at CHICOPEE and HARTFORD. Factories for motor carriages are multiplying now. The workshops of the railway systems form great industrial plants in some cities (p. 85); and in PROVIDENCE and TAUNTON there are important locomotive works.



**Commerce.** *Trade Centres.*—Most New England villages are trading points for the surrounding farmers. Every country store purchases eggs and butter, and in return sells groceries, dry goods, tools and other wares. The cities are centres of trade for still larger districts. Instead of one little store there are many large ones, each keeping a full assortment of goods in some one line. The stores of the larger cities bear the same trade relation to the nearby towns that the traders in the villages bear to the surrounding country. Wholesale stores and agents in the large cities receive the surplus of the farms, goods from the factories, and many products from outside of New England, and distribute them to retail stores in the towns. Some large ports receive raw materials—such as fibres, rubber, and dyestuffs—for the factories situated inland, and send away manufactured products from these factories. These ports are therefore great trade centres.

*Boston.*—Boston is the greatest centre for New England commerce. It is connected by steamship lines with European ports, with most Atlantic ports of North America, and with the West Indies. The location of Boston on a harbor at the most westerly point of the coast north of Cape Cod, and so centrally situated that railway lines were readily built so as to radiate to all the great mill cities, has enabled its merchants to make it the second seaport of the United States.

As a wool market Boston is surpassed by London alone. The costly stocks of wool kept in the city offer so wide a range of choice that they attract buyers regularly from Philadelphia and from mills elsewhere in the country. The offices of more than a hundred firms engaged in the sale of wool are found grouped near the Southern Union

Station. A few steps away, in great warehouses along the water front, are stored bales of wool from the Western and Southern States, from Australia, and in fact from all the world. Here the would-be purchaser may select wool of just the quality he needs.

Boston imports more Egyptian and Peruvian cotton than any other American port, and it also exports much American cotton. Brokers have agents in the Southern States buying up cotton, which is sold in Boston from samples, and then shipped directly to the mill from the cotton gins. The banks loan the money to purchase the cotton, and later receive their money, with interest, when the mills have made the fibre into cloth.

Boston, therefore, is a great financial centre, not only investing capital to establish mills, but also supplying that which is needed for their transactions. There is a United States sub-treasury in the city, which acts as an agency of the national government in its financial dealings with the people of New England. Near the sub-treasury are many national banks, where the working capital of merchants is deposited. The merchants pay for their goods by bank checks, which may be cashed at banks throughout the cities and towns of New England. In the same portion of the city is the Boston Stock Exchange, whose members act as agents for people who wish to invest money in the stocks and bonds of the many corporations. All the great insurance companies of the world have offices or agencies in Boston.

Boston is the greatest American market for leather and leather goods (p. 57). Leather is shipped there from tanneries all over the country and a part of it is sold to factories outside of New England. Some of the shoes made from this leather return to Boston for sale ; in fact, many shoe factories have Boston offices where their sam-



FIG. 34.

View from Stock Exchange building, Boston. Note the State House dome at the left, and the old State House in the foreground.

ples are displayed for examination by purchasing agents, who come here from cities all over the country.

Most of the textile mills, machine shops, and other New England factories also have offices in Boston for the sale of their products. The business centre for southwestern New England is New York City, though many large corporations have offices in both cities.

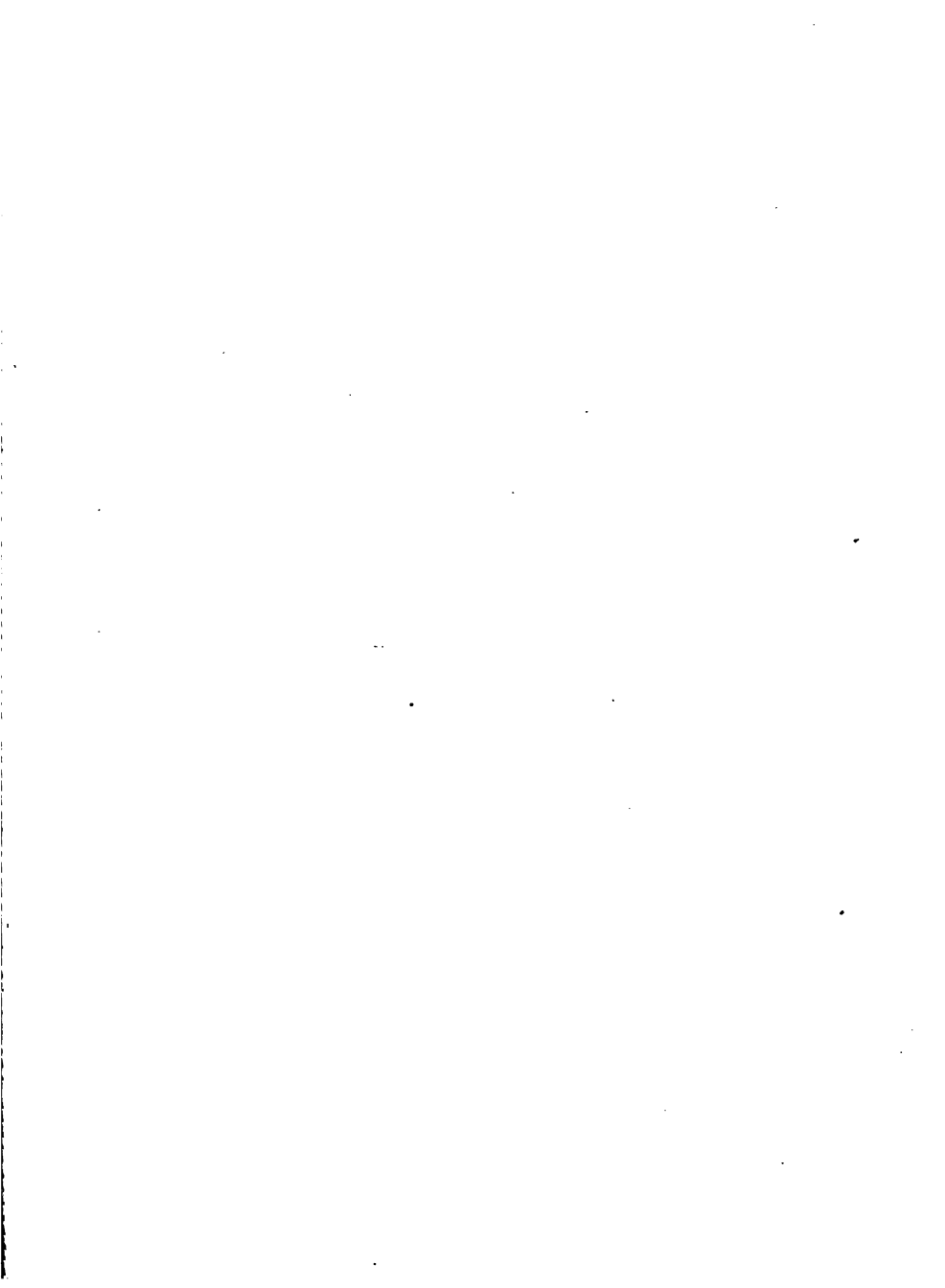
Populous commercial cities are the seats of many and varied manufacturing plants because of the abundance of materials and labor, and the ready market. Boston leads

other New England cities in some lines of manufacture. It leads, for example, in the manufacture of clothing and also in the publishing and printing of books and periodicals. In fact, the goods manufactured in Boston far exceed in value those of any other New England city. Furthermore, while every growing city employs men of many trades in erecting buildings,—architects, contractors, and firms which supply building materials are especially numerous in the larger cities, like Boston, where contracts for work all over New England are awarded.

Large cities are also seats for the preparation of food products for shipment and sale. This is well illustrated in Boston and surrounding towns. Coffee, imported at Boston, is roasted and ground there; spices are ground and packed. Sugar is refined; chocolate is manufactured; and candies are made from both substances. Although cattle are slaughtered in western cities, and the dressed beef shipped to many distributing centres in New England, trainloads of hogs come to large pork-packing houses in CAMBRIDGE and SOMERVILLE, near Boston, there to be killed and dressed for the New England market.

### MASSACHUSETTS

The "Bay State" contains half the population of New England, although comprising but an eighth of the area of the section. Of the fourteen cities of New England having more than sixty thousand inhabitants ten are in Massachusetts. Which are they (p. 124)? Nine of these largest cities and most of the people are in the eastern part of the state which belongs to the Piedmont belt. In fact, nearly half the population, that is one-fourth of all













in New England, live in the *Boston Basin* and the shallow valleys opening from it (Figs. 15 and 36).

**Boston Basin.**—The lowland of the Boston Basin is dotted with drumlins, some rising from the mud flats of the harbor as islands (Fig. 38), others affording building sites

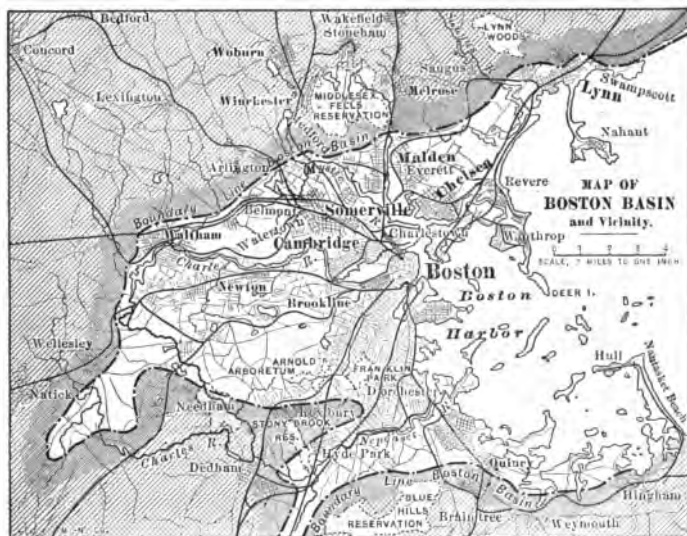


FIG. 36.

**Boston Basin.**

for the city. Among these are Beacon Hill, on whose summit is the gilded dome of the State House (Fig. 34), and the Charlestown hills, on which the battle of Bunker Hill was fought. Within the basin are extensive salt marshes, whose level surface is crossed by winding tidal creeks; and there are also areas of hard rocks of moderate elevation, such as those of the Highland District at Rox-

bury. An upland rim rises sharply around this oval basin. Its more rugged portions are reserved as wooded parks, such as the Lynn Woods and the Middlesex Fells at the north, and the Blue Hill Reservation at the south.

A broad and deep channel has been dredged in the harbor, leading to the docks of European steamship lines at East Boston, to the Navy Yard at Charlestown, and to the Boston wharves which are used by steamers and schooners from American ports (Fig. 35). The great commerce



FIG. 37.

Marshes, creeks, and drumlins of Revere (Fig. 36).

centred here has made land about the harbor so valuable that many acres of marshes and mud flats have been shut off from the sea and filled in as "made land." This new land is now covered with costly buildings (Fig. 20).

The large cities of CAMBRIDGE, SOMERVILLE, CHELSEA, and EVERETT are continuous with BOSTON on the north, though separately governed. Soon after the Civil War Charlestown, Brighton, Roxbury, and Dorchester were annexed to Boston; but BROOKLINE, although nearly enclosed by parts of Boston (Fig. 35), refused annexation. Its people, numbering twenty thousand, prefer to retain their town form of government.

Many cities and large towns are situated just within the rim of the Boston Basin, where railway lines enter valleys leading from the basin. The more important are LYNN, MALDEN, MEDFORD, WALTHAM, NEWTON, HYDE PARK, and QUINCY. Many people who are engaged in business in Boston have their homes in these cities and towns, and in others outside the basin, like DEDHAM and MELROSE. Most of these suburban places have thriving industries of their own. You have already learned what are the leading industries of Lynn, Chelsea, Malden, Woburn, Waltham, and Quincy (pp. 52, 57, 60, and 61). Market gardening is very important in ARLINGTON and other towns northwest of Boston (p. 46).

To secure a pure and abundant supply of water for the dense population gathered in and about Boston it is necessary to bring it from far inland. The great expense involved requires united action, and therefore by state law a Metropolitan Water Board, appointed by the governor, expends the funds raised by taxation in the sixteen cities and towns that have already entered the Metropolitan Water District. Boston had already built aqueducts to bring water from Lake Cochituate and from reservoirs on the headwaters of the Sudbury River; and now the largest reservoir in the world, with the exception of one in India, has been constructed in the valley of the Nashua River above Clinton (Figs. 9 and 35). The water is gathered from a large area of upland southeast of Mt. Wachusett.

There is also a Metropolitan Sewerage District; and great trunk sewers, through the Mystic, Charles, and Neponset valleys, gather the sewage from the towns and cities near Boston, and carry it to the outer harbor. Besides parks owned by cities and towns, a Metropolitan Park Commission has charge of a great system of public reservations. These are located along the water front (Fig. 38), the river banks, and on the upland border, with connecting parkways, thus holding some of the most beautiful portions of the land for the people.



FIG. 38.

Nantasket Beach, part of the metropolitan park system. The low curves on the left are drumlin islands in Boston harbor.

Naturally Boston is a great educational centre. The colleges and professional schools which constitute Harvard University at Cambridge form a busy and populous community in themselves, and afford employment to many people besides the hundreds of students. Near by, Tufts College overlooks Medford from a drumlin hill. There is a large state school for feeble-minded children at Waltham. Boston itself is the seat of the Massachusetts Institute of Technology, Boston University, Boston College, the Perkins Institute for the Blind, and schools of music, painting, and other fine arts. The Boston Public Library has one of the most valuable collections of books in the country, housed in a noble building.

**Piedmont Belt.** — Outside the metropolitan districts are three groups of cities and towns engaged in the manufacture of shoes. South from Boston, in BROCKTON and more than a dozen nearby towns, such as WEYMOUTH, there are large factories for making fine shoes for men and boys. Men's shoes are also made in the factories of FRAMINGHAM, MILFORD, and many towns to the west-

ward, while MARLBORO ranks fourth among New England cities in the manufacture of shoes. North of Boston, women's shoes are a specialty, notably at SALEM, BEVERLY, and several large towns near LYNN, which has always been the leading centre for this industry. What places in this district tan leather (p. 57)?

Farther from Boston most manufacturing communities of the Piedmont belt are engaged in the manufacture of textile goods, although the manufacture of shoes is also important toward the north, and that of metallic goods toward the south. LOWELL, the "City of Spindles," and LAWRENCE, where over half the worsted cloth (p. 55) made in the state is woven, use the water power of the Merrimac (p. 22), and also steam power. Textile mills are also located at the falls of tributary streams in several adjoining towns. HAVERHILL ranks third among cities making shoes, its specialty being women's low cut shoes, or oxfords. Shoe manufacture is the leading industry at NEWBURYPORT (Fig. 30) also, and there are shoe factories in all the cities of the Merrimac valley and in several of its towns. AMESBURY manufactures carriages.

WORCESTER, the "heart of the commonwealth," is in a valley at the western border of the Piedmont belt. As it is the third city of New England in size, and the trade centre for surrounding factory villages, its manufactures, in addition to its great production of machinery and wire (p. 62), are many and varied. CLINTON manufactures carpets (p. 55). SOUTHBRIDGE, WEBSTER, and other towns on the headwaters of the Quinebaug and Blackstone have many textile mills. Straw goods are made in the towns near FRANKLIN. Many years ago hats were made in this vicinity from braided straw, in imi-

tation of those imported from Europe, and this household industry was later transferred to factories.

In Bristol County are the cotton-manufacturing cities of FALL RIVER, NEW BEDFORD, and TAUNTON (p. 53). Nearly half the products of Taunton are metallic goods, — tacks and nails, stoves and furnaces, machines and tools (pp. 61 and 62). The manufacture of jewellery and silverware, which centres at Providence (p. 61), has brought prosperity to the neighboring Massachusetts towns, ATTLEBORO and NORTH ATTLEBORO.

Owing to its shallow harbor, PLYMOUTH remains a town, although it is the oldest settlement in New England. The products of its various factories include cordage and tacks. The city of GLOUCESTER has a better harbor, and has so developed its early interest in the fisheries that two-thirds of this business in the state now centres there (p. 33). It has manufactories connected with the fisheries, including fish glue, anchors, nets, and twine. It is also one of the leading centres for granite (p. 49). Along the seacoast, from Cape Ann to Plymouth, many Boston families have their summer homes.

In the Piedmont region there are a number of important educational institutions; for instance, Wellesley College for women, at Wellesley (Fig. 36). Worcester is the seat of Clark University, the College of the Holy Cross, and Worcester Polytechnic Institute.

**Cape Cod.** — Cape Cod and the islands of Martha's Vineyard and Nantucket consist of moraine hills and sandy plains that were deposited from the glacier (p. 8). Their soils are not generally fertile, and large areas are covered with a scrubby growth of trees, where a few deer still live. Once all the towns were prosperous, and ex-

tensively engaged in fishing and commerce. Now, since more than half the fishing schooners of the Cape sail from PROVINCETOWN, Nantucket and the little villages of Cape Cod beyond Barnstable are losing population. Many summer residents, attracted by the ocean breezes, which make the summer climate cooler than that of interior counties, have built cottages in the western towns of Cape Cod, and on Martha's Vineyard and Nantucket.



FIG. 39.

Outer cliff of Cape Cod — Highland Light (p. 13).

Nantucket was formerly celebrated for its whaling industry. Whales were numerous near the island at first. When sighted, boats were manned, the whales harpooned, and the blubber, or fat, made into oil. The demand for the oil for use in lamps made the industry important, and the daring sailors of NEW BEDFORD, NANTUCKET, STONINGTON, NEW LONDON, and many lesser ports, hunted whales and seals in all the oceans. Partly on account of the decrease in the number of whales and partly because of the discovery of petroleum and the use of kerosene oil, the whaling industry has declined. There is only a small American whaling fleet to-day, and the chief value of the catch is in the whalebone.

As already mentioned (p. 43), cranberries are an important

agricultural product from Plymouth to Provincetown. The rich soil of the bogs is cleared of bushes, and covered with sand to prevent the easy growth of weeds. Cranberry plants are set out, and in time they cover the sand with a mat of vines, which are crowded with dark red berries in September. Winds from the sea tend to prevent early frosts. Many children share in the work of carefully picking the berries.

**Connecticut Valley.** — The densest population in western Massachusetts is in the southern part of the broad Connecticut valley (Fig. 15). Where the Connecticut and its tributaries have cut away the sands of the flood-plain terraces to the sandstone ledges beneath (p. 10), the water power available has occasioned the growth of the manufacturing cities of HOLYOKE (Fig. 14), CHICOPEE, and NORTHAMPTON, and of a half dozen towns of which WESTFIELD is the largest. SPRINGFIELD, the railway and trade centre for the district, has become its largest city. It has varied manufactures. Firearms are made in the United States arsenal here. What manufacturing interests are prominent in the other cities (pp. 56, 62)? At the northern part of the valley, where the railway that passes through the Hoosac Tunnel crosses from the valley of the Millers River to that of the Deerfield, there is situated the pretty town of GREENFIELD, a railway centre. Near by are the mills of TURNER'S FALLS. There are well tilled farms throughout the valley (p. 83).

HOLYOKE is the leading American city in the manufacture of fine paper from rags. The industry is important at other places in the Connecticut valley. Rags are received from the nearby seaports and great cities, and the water of this section is specially adapted to paper manufacture. In the paper mills the rags are sorted and freed from buttons and dust, then cut, boiled, and soaked in chemicals until they form a mass of pure



white pulp. This is washed, ground finer still, colored to the shade desired, and then made into paper (p. 41). The sheets are dried, rolled smooth, cut to size, and prepared for sale.

Some of this high-grade paper is made into envelopes and letter sheets, and some is sold to be made into ledgers or to be printed as bonds and stock certificates.



FIG. 40.

The Connecticut Valley from Mt. Holyoke. Compare Fig. 2.

The pleasant and prosperous Connecticut valley is the seat of numerous important colleges and higher schools throughout its length. In Massachusetts are Amherst College and the State Agricultural College at AMHERST, and two colleges for women, — Mount Holyoke College at SOUTH HADLEY, and Smith College at NORTHAMPTON.

**Uplands and Valleys.** — The decreasing population of the upland towns, their deserted farms, the small trading

villages, the coming of summer boarders and summer residents, have been mentioned. The only large towns on the central upland are GARDNER, with its chair factories, and SPENCER, with its shoe shops, each situated near where the main line of a railway rises to the upland level.

The largest places are in the narrow valleys where the rivers afford water power and the railways communication. PALMER and WARE toward Springfield, and FITCHBURG and LEOMINSTER at the north, are good examples. In the city of FITCHBURG a great variety of products is manufactured in the large worsted, cotton, and paper mills, the machine shops, shoe shops, and bicycle works.

In Berkshire County the Housatonic and Hoosac rivers have cut an open and fertile valley in a belt of limestone rocks, and in this valley many people live. Marble is quarried at LEE. At the north the railway from Boston through the long tunnel beneath Hoosac Mountain has helped to bring prosperity to the cotton mills of ADAMS and to the textile mills and shoe shops of the city of NORTH ADAMS.

Williams College is in WILLIAMSTOWN. The city of PITTSFIELD, on the main line of the Boston and Albany, is well located to secure the trade of the Berkshire valley. Woollen cloth, electrical machinery, and varied products are made here. Fine papers are made in several of the towns of the county. All the paper for bank notes is made at DALTON. In towns south of Pittsfield, and especially at LENOX, the beautiful scenery has led wealthy people from New York to erect costly dwellings for summer homes. The summit of Mount Greylock is a state reservation, and other reservations are planned.



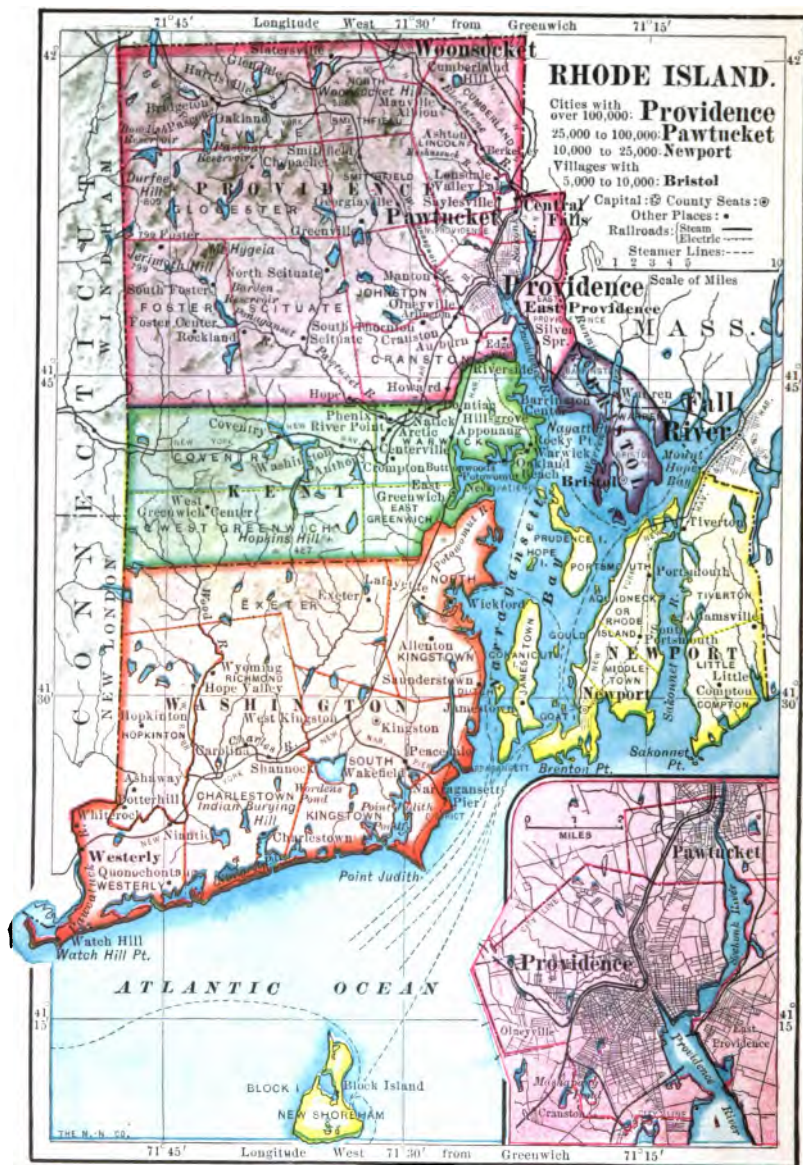


FIG. 41.

## RHODE ISLAND

Rhode Island, the smallest state in the Union, is remarkable for having the largest population for its area of any state. But the people are not uniformly distributed throughout its territory. Four-fifths live at the head of Narragansett Bay and along the rivers centring there, making this district, with the exception of the Boston Basin, the most densely settled in New England (Fig. 15).

Most of the Narragansett Basin within the state has been submerged, or drowned, by a sinking of the land. This has caused good harbors near the falls which occur where the streams descend from the uplands bordering the basin (p. 53). A profitable commerce early developed at these inland harbors, and some of the capital gained was invested in manufacturing at the nearby water powers (p. 23). More recently great mills dependent upon coal for power have been built at the head of the bay. Thus the physiography of Rhode Island has enabled its people to become so successful a manufacturing community that the state stands preëminent in the value of its manufactures as compared with the size of its population.

Textile manufactures constitute half the total product, machinery and metal goods an eighth, and jewellery and silverware nearly as large a proportion. Rubber shoes are the most important minor product.

**Providence and Vicinity.** — PROVIDENCE is the capital of Rhode Island. It was originally a lumber-shipping port, although now the remaining wooded tracts of the uplands and the swamps supply little except firewood. A large foreign commerce developed here (p. 20), since its harbor, like that of Boston (p. 63), is centrally located at the head

of a bay. While the exports are insignificant, because the state's manufactured products are sent to New York or Boston for shipment, raw materials are still imported. Typical imports are fibres, steel bars, precious stones, india rubber, dyewoods, and chemicals. Coasting vessels bring much coal, also lumber and building materials; while the steamship lines from New York and other coast ports carry general merchandise as well as passengers.

Among New England cities Providence is next to Boston in size, for its position has favored manufacturing as



FIG. 42.

Providence. Railway station in foreground, Capitol on the right, and Normal School in the center, in the distance.

well as commerce. The value of its manufactures is half the total for the state. Providence leads New England cities in the manufacture of worsted goods (p. 54), and has extensive bleaching, dyeing, and printing works, as well as cotton mills. Almost all the jewellery and silverware made in the state is manufactured here, also a large proportion of the iron and steel products, which include heavy machinery, screws, files, and fine tools. Suburban manufacturing villages in EAST PROVIDENCE, JOHNSTON, and CRANSTON are rapidly growing as residential places;

and a system of sewers has been extended to the suburbs. Providence is the seat of Brown University.

North of Providence, the cities of PAWTUCKET and CENTRAL FALLS, with adjoining villages, form a smaller manufacturing centre, which is reached by coal vessels of light draught (p. 23). Cotton goods are here more important than woollens, and there are cotton mills in successive villages along the Blackstone River, in the towns of CUMBERLAND and LINCOLN (Fig. 29). WOONSOCKET is the third largest city in the state. It produces cotton and woollen goods, machinery, and rubber shoes.

At the water powers of the smaller rivers, in the villages of JOHNSTON, BURRILLVILLE, and several towns, northwest of Providence and west of Woonsocket, woollen goods are manufactured. Southwest of Providence there are many cotton mill villages on the Pawtuxet River (p. 52), in the populous town of WARWICK and in COVENTRY. The towns of Bristol County, on the low peninsulas (Fig 43) that extend into the bay between Fall River and Providence, also manufacture cotton and woollen goods. BARRINGTON has great brickyards. BRISTOL is widely known, since several noted yachts have been built there to defend the America's Cup against English challengers. Torpedo boats for the navy are also built at Bristol.

**Narragansett Bay.** — Many of the low hills of the former Narragansett lowland are now islands (p. 7), separating the bay into north and south channels. The outer end of the island of Aquidneck, or Rhode Island, is composed of granite, and protects the fine harbor of NEWPORT. A large foreign commerce was developed there in colonial times. Later this was lost to mainland ports like Providence; but the outer harbor, that of Newport, has continued to be most convenient for fishing fleets. Now,

however, there are often more costly yachts than fishing boats in the harbor (p. 34), for Newport is the most famous and fashionable coast resort of the country. Many stately dwellings, the summer homes of wealthy people of New York and other cities, overlook the ocean along the Cliff Walk. The city was formerly a state capital. Its manufacturing interests are small.



FIG. 43.

Narragansett Bay, looking from Providence.

Many points on the islands and the shores of Narragansett Bay are frequented by summer visitors, and Rhode Island clambakes have long been a famous attraction. NARRAGANSETT PIER and JAMESTOWN are well-known resorts; so also is the town of NEW SHOREHAM on Block Island.

The fisheries form a minor industry. Near the head of the bay, oysters (p. 86) and scallops are dredged in the shallow waters, and clams are dug on the mud flats. Some lobsters are taken in the lobster pots, or traps (Fig. 62), that are set in the deeper waters outside the bay. Many of the shell-fish, and the food fish taken by vessels, are sent by night boats and trains to the early morning markets of Boston and New York.



The menhaden fishery is of special importance. Menhaden are small fish, too bony and oily to be valued for food, but very abundant. In the warm season great schools appear in the shallow waters about Long Island, and large numbers are seined (p. 37) and taken to the factories at TIVERTON, where the fish oil is extracted and the remainder made into fertilizer.

The islands and shores of the bay have well-cultivated farm lands; and near the cities, as would naturally be expected, the production of milk and vegetables is important. There are large market gardens at CRANSTON. Poultry farms are especially numerous in LITTLE COMPTON.

**Uplands.** — The low uplands in the western part of the state are sparsely peopled, some towns that lie away from the railways having less than a thousand inhabitants. The upland portions of other towns contain abandoned farms, and have lost population (p. 25). While many immigrants from Europe and Canada have found employment in the manufacturing cities and villages (p. 29), the upland farmers are descendants of the early settlers.

The streams from the southern slopes of the upland are checked by the line of moraine hills along the coast (p. 8 and Fig. 6), and form several lakes and extensive swamps, which overflow westward as the Pawcatuck River. These swamps were once a refuge for the Indians, and here many were killed in the greatest battle of King Philip's War. The Pawcatuck valley to-day has prosperous farms, and the State College of Agriculture and Mechanical Arts is at KINGSTON. Woollen cloth is made in the manufacturing villages located at water powers in this section (p. 54), for the Shore Line railway from Boston to New York affords an outlet for the goods made.

The southern coast is marked by a wave-built bar and

shallow lagoons (p. 13). Since there are no good harbors, few people live on the shore and the moraine. WESTERLY, the port at the mouth of the Pawcatuck River, is the largest town of Washington County. Its factories produce cotton and woollen goods, printing presses, and other machinery, and there are important granite quarries (p. 49). WATCH HILL, at the western end of the moraine, is a summer resort.

### CONNECTICUT

**Central Lowland.** — Most of Connecticut consists of the southern slopes of the New England upland ; but the state is crossed from north to south by the sandstone lowland of the Connecticut valley. Nearly half the people of the state live in this lowland strip, for several industries find favorable conditions there (compare p. 74). For instance, the sandstones are quarried for building purposes, and the blocks are shipped down the river to coast cities.

The Connecticut River and its tributaries occupy the valley north of Middletown ; the deep clayey loam of the river terraces (p. 10) is fertile, and agriculture has prospered here from the earliest days. At Middletown the river turns eastward in its course to the Sound at Saybrook ; but it has worn only a narrow valley in the hard rocks of the upland. The broad lowland continues to New Haven, the sandstones having been removed, as fast as they weathered, by the Quinnipiac and other small streams. This part of the valley is overspread by glacial sands and is less fertile than the flood-plain terraces.

The lowland conditions are more favorable to agriculture than those of the uplands. The soil is better and the











FIG. 45.

The Hanging Hills of Meriden, formed by broken and tilted lava beds (p. 7).

climate milder. Dairy farms and market gardens (pp. 46 and 47) abound in the lowlands near the cities, and some valley farms raise garden seeds (p. 48). There are large peach orchards. Much seedleaf, or Havana, tobacco is grown, and it is sold for use as cigar wrappers.

The heavy soils of the lowest terrace, containing much clay and fine silt, and therefore retentive of moisture, give a large yield of heavy, coarse tobacco. The light sandy soils of higher terraces produce a light-colored, thin-textured leaf, which is now much preferred. The leaves are dried and cured in tobacco barns. These have walls with many shutters, which are opened in pleasant weather to allow the air to circulate through the tobacco as it hangs within.

The growth of cities and large towns in the Connecticut valley lowland is due to the commercial advantages and the consequent development of manufacturing by the energy and inventive enterprise of the people. Even in colonial days, clocks, tinware, and "Yankee notions" were made by hand in the valley towns and sold from pedlers' carts. The railways that have easily been built along the lowland have greatly stimulated production. They bring the coal, metals, fibres, etc., for use in the



factories, and convey the manufactured goods to all parts of the country or to New York for export.

Instead of producing large amounts of a few staple products like cotton cloth or shoes, the factories of every city and town make a great variety of goods. More than twelve hundred articles and kinds of products are listed in the state reports as regularly manufactured in Connecticut. However, various brass goods constitute over a fourth of the value of the state's entire product; and textiles, manufactures of steel and iron, and rubber goods aggregate nearly half the total. Paper goods (p. 74), silver and plated ware, corsets, hats, and musical instruments are produced to the value of several million dollars each.

HARTFORD, the capital, owes much of its growth to its position at the head of navigation on the Connecticut (p. 23). Numerous steam and electric railways radiate from the city through the surrounding agricultural country and manufacturing towns. Naturally, therefore, it is a great trading and business centre. There are extensive manufacturing plants, which make machinery, firearms, bicycles, and many other goods; and many insurance companies have their home offices in Hartford.

Toward Springfield there are a few manufacturing villages. For example, there are great carpet mills at Thompsonville (p. 55), and powder mills at Hazardville, two villages of ENFIELD. Beyond the suburb of EAST HARTFORD are the silk mills of SOUTH MANCHESTER, where several generations of mill owners have lived near their operatives and cared for their welfare. An electric road extends to ROCKVILLE, at the upland border, where woollen goods and other textiles are made.

A few miles to the south of Hartford is the city of NEW BRITAIN, the leading centre for the manufacture



of hardware. BRISTOL and SOUTHTON are the largest of several nearby manufacturing towns. A little farther south, MERIDEN produces more silver-plated ware than any other city in the country, and MIDDLETOWN and WALLINGFORD are important manufacturing places. Every one of these six manufacturing communities contains many factories, which make a great variety of products.

The largest city of Connecticut is NEW HAVEN, which resembles Boston and Providence in its situation at the head of the drowned portion of a lowland basin. In



FIG. 46.

New Haven from East Rock. Compare Fig. 2.

colonial days it exported meat and lumber to the West Indies. After the Revolution its commerce increased, and a large trade was carried on with China; but since the Civil War manufacturing has been the leading interest. Raw materials are supplied and products distributed by an extensive coastwise trade. The early manufactures of carriages, clocks, and locks are now supplemented by those of firearms, rubber goods, and other articles. The main offices and the construction and repair shops of the great railway system of southern New England are at New Haven, and give support to a tenth of the people.

There is a fine park system, which includes parts of the bay shores and affords views from East Rock (Fig. 46) and West Rock, which are lava ridges. The beautifully shaded streets about Yale University and the "Green" have suggested the name "Elm City" for New Haven.

Yale University is one of the leading educational institutions of the country, and most of the higher schools of the state are likewise in the cities of the Connecticut valley lowland. Trinity College occupies a commanding site in the outskirts of Hartford, and Middletown is the seat of Wesleyan University.

**Coast.** — The coast of Connecticut is less irregular than that of Maine because the land is lower and less deeply drowned; but the large rivers of the state have long tidal estuaries, and there are many small harbors. Sands and clays from the melting glacier filled the heads of many bays, forming plains which are easily cultivated. The growth of salt marshes, as at New Haven (Fig. 46), has further reduced the size of the indentations.

The sheltered waters of Long Island Sound favor the growth of oysters; and the planting of oyster beds and dredging for oysters are important along the entire coast. Most oysters are brought to market at NEW HAVEN, SOUTH NORWALK, and other large ports near New York City.

When oysters became scarce on the natural beds along the shore of Connecticut, they were brought in schooner loads from Chesapeake Bay to New Haven harbor, and laid down on a sandspit there to fatten for market in the fall. Small oysters were also dredged in the Sound and placed on private grounds in the shallow waters of many bays, and, after a few years' growth, were taken up for market. The oyster, when first born, swims or floats freely in the water, but soon attaches

itself to any clean, hard substance it meets. Therefore it came to be the practice to scatter mother oysters over selected portions of the bottom of Long Island Sound, and at the spawning season, early in July, to spread the same ground freely with boat loads of old oyster-shells to which the young oysters might attach themselves. Thus many oysters were led to settle and grow in places where there had formerly been few. To-day the bottom of Long Island Sound, out to the New York state line, is largely in the hands of private owners.

In years past, NEW LONDON and STONINGTON were very prosperous ports, with great whaling and sealing fleets (p. 73). Now the manufacture of textile goods and machinery is more important to them than commerce or fisheries. At each port steamboats plying to New York exchange freight and passengers with railways that run to the cities of Massachusetts and Rhode Island. The harbor of New London is the best on the Sound; there is a United States navy yard there, and many yachts make the river gay in summer (p. 34). Between New London and Stonington is GROTON, where shipbuilding (p. 21) still continues.

In recent years the ports near New York have been best situated for growth as manufacturing and residential centres (Fig. 15). BRIDGEPORT, one of these, is the third city in the state. Its factories produce sewing machines, ammunition, heavy metallic goods, and many special products. STAMFORD and GREENWICH, and the two cities of NORWALK and SOUTH NORWALK, are other coast points engaged in manufacturing.

**Western Upland.** — The upland rises to fifteen hundred feet in height in the northwest, and a number of peaks upon it are several hundred feet higher. The rivers flow

southward in narrow valleys, which are followed by the railways. One line crosses the upland from the Connecticut valley to that of the Hudson River, but by steep grades.

The interests of the higher uplands are those characteristic of Vermont (p. 100). For example, dairy farming is the leading industry of many towns. The quiet beauty of LITCHFIELD and other towns attracts summer residents



FIG. 47.

The Naugatuck valley. Notice the upland level. Where are the railways?

(p. 28). The valley lands are more fertile than the uplands; for instance, much tobacco is grown in NEW MILFORD in the Housatonic valley. Iron is still mined and smelted in several towns along the northwest border (p. 60).

The valley of the Naugatuck, from its highest tributaries to tidewater, has been made the seat of busy industries by the energy and skill of its people. The cities of WATERBURY, ANSONIA, and DERBY and the boroughs of TORRINGTON and NAUGATUCK are the important

points. WINSTED is a little farther north, and SHELTON a little south at the head of navigation on the Housatonic River. A long list of manufactured articles is produced in every place. WATERBURY is the fourth city of Connecticut and is growing rapidly. It is a railway centre and is therefore closely connected with the cities of the Connecticut lowland. Its manufactures of metals are both extensive and varied, including a product of several thousand watches and clocks every day; but it is most noted as the centre of the brass industry in America.

A century ago metal buttons were made in Waterbury, and the use of brass for this purpose led to the rolling of brass, and the manufacture of many other articles from it. Three-fourths of the brass rolled in the country is made in the Naugatuck valley, and the few mills now in operation elsewhere were established by Connecticut men. Here has been developed the skill necessary to combine properly the copper and zinc to form brass, and to roll it into plates or draw it out into wire that shall be exact to size, even to the fraction of a thousandth of an inch. This most valuable of all alloys is easily worked, and may be cast, rolled, drawn, or stamped into shape for use; and when it is finished, it is not only hard and strong, but easily takes a beautiful polish.

DANBURY, another railway centre, has for a century been the leading community in the country for the manufacture of hats and caps. Machinery for cutting fur, and for felting and shaping it into hats, is made there.

**Eastern Upland.** — The eastern upland is lower than the western, and is mainly within the Piedmont belt. While two railways follow valleys northward from Norwich into Massachusetts, two others wind across the upland from valley to valley, connecting Boston and New York, and Providence and Hartford, by the most direct routes.

The section is closely allied to Massachusetts and Rhode Island in its interests; for instance, the textile industry leads in the cities and boroughs of the valleys (p. 52). A Boston milk train starts from Willimantic (p. 46), and outside the manufacturing communities dairy farming is the leading industry, as elsewhere in New England.

NORWICH is the largest city in eastern Connecticut. Its position at the head of tidewater (p. 23) favored its commerce in the past, as it favors its manufacturing interests to-day. Its mills use both water power and steam in making cotton and woollen goods, paper, and a variety of machines and other steel and iron products. PUTNAM and villages in THOMPSON, KILLINGLY, PLAINFIELD, and several towns near Norwich, use the water power of the Quinebaug and smaller rivers in manufacturing cotton goods and other textile products. The city of WILLIMANTIC is situated on the Shetucket River at the point where several railway lines must cross each other. The cotton thread (p. 56) and sewing silk produced there have made the city's name familiar. Farther up the valley the villages of STAFFORD are engaged in woollen manufacturing (p. 54).

Young mulberry trees and silk-worm eggs were brought to Windham County before the Revolution, and the production of raw silk was then commenced. Early in the last century, this experiment in raising silk was extensively tried throughout eastern Connecticut, and sewing silk was spun on the farms. For a time the skeins of silk were used like money as a medium of exchange. A blight appeared which destroyed the trees and stopped the production of silk; but for many years thereafter Connecticut was the leading state in the manufacture of silk cloth and twist from imported silk (p. 56).

## NEW HAMPSHIRE

**The White Mountains.** — The “Granite State,” famous for its mountain scenery, attracts many visitors every year. In the southwestern counties lone peaks (Fig. 53), like Monadnock, rise above the general level of the upland, and northward are groups of mountains. The northern part of the state is composed of such hard rocks that most of the surface consists of forest-covered mountains.



FIG. 48.

The Presidential Range in winter, from the west. Compare Fig. 49.

In the central White Mountains the peaks rise to a height of a mile or more above sea level, and are divided by deep valleys into irregular groups or ranges. The Presidential Range is the best known. During the summer, trains ascend the cog-wheel railway to the hotel at the summit of Mt. Washington, nearly a mile higher than the railway which passes through Crawford Notch.

The notches are north and south valleys which were greatly deepened when glacial ice was crowded through them. The Franconia, Crawford, and Pinkham notches afford the only direct routes for highways between the



FIG. 49. — C.N., Crawford Notch; P.N., Pinkham Notch; Mt. W., Mount Washington.



towns of the Ammonoosuc and Androscoggin valleys on the north and those of the Pemigewassett and Saco valleys to the south. For instance, a highway passes from LITTLETON to PLYMOUTH through Franconia Notch (Fig. 5).



FIG. 50.

Crawford Notch, from Mt. Willard, looking south. Compare Fig. 49.

There are large hotels for summer tourists in the notches (Fig. 5), and in some of the surrounding villages, such as BETHLEHEM and NORTH CONWAY; and in all the mountain towns there are many boarding houses. Tens of thousands of people come here yearly to escape the cares of city life, and to gain health and pleasure while climbing the mountain trails, driving along picturesque country roads, enjoying outdoor sports, or quietly watching cloud shadows pass across the grand mountain views (p. 28).

There are also many boarding houses and cottage homes on the southern upland, especially on the shores of Lake Winnepesaukee, Lake Sunapee, and other beautiful sheets of water. Other summer resorts are along the coast, at Hampton and Rye beaches, and on the Isles of Shoals. The celebration of "Old Home Week" brings back to their childhood home many natives of the state who now live in distant cities. It is estimated that over five million dollars is expended yearly among two hundred towns by visitors from outside the state.

North of the White Mountains the forests are continuous with those of Maine, and logs are floated down the Androscoggin and the swift headwaters of the Connecticut to falls, where mills convert them into lumber, paper pulp, and paper (p. 41). From the large mills of BERLIN, the only city north of the mountains, pulp and paper are sent to all states east of the Mississippi River. Lumber railways have been extended up many valleys of the White Mountains to bring the logs out to the mills; but the desire is increasing that the forests, so essential to the beauty and attractiveness of the mountain scenery, and so useful in preventing the water of the rains and melting snows from running rapidly off, may be preserved as a state reservation (p. 76).

**Piedmont and Merrimac Valley.** — Half the people of the state live in the Merrimac valley and in the southeastern counties, which belong to the Piedmont belt. Here are most of the cities and large towns, whose people are mainly employed in trade and in the manufacture of textiles, shoes, and machinery.

The coast consists mainly of broad sandbar beaches, built by the sea waves, and broad tidal rivers (p. 13). Farther inland there are clay beds, affording material for

brickyards. Sandy plains of glacial drift cover much of the Piedmont country between the terraced flood-plains (p. 10) of the Saco and those of the Merrimac. The farms of this section produce milk and vegetables for use in the cities and towns, or to be sent by rail to Boston. Several towns have creameries for making butter from milk produced by the herds of many farms. One creamery is at the State Agricultural College in DURHAM.

PORTSMOUTH, on the estuary of the Piscataqua, has the only good harbor of the state. Its commerce made it at one time the largest city, but now those manufacturing cities which use water power, and which are connected with Boston by railway, are much larger. A United States navy yard is located on Portsmouth harbor, at KITTERY, Maine. Near Portsmouth the city of DOVER, and several towns like EXETER, are situated where the falls of small rivers enter tide-water; and on falls farther inland are ROCHESTER and SOMERSWORTH. These places are engaged in the manufacture of cotton and woollen goods, shoes, and products from wood and metals. There are shoe factories in many smaller towns of the state, as in FARMINGTON, DERRY, and SALEM in this southeastern district. Half the manufactured products of the state, in value, consist of cotton goods and shoes, in about equal proportion. Lumber, paper, and other manufactures of wood together amount to one-fifth of all.

The three largest cities of the state — MANCHESTER, the "Queen City," NASHUA, and CONCORD — are on the Merrimac. The water from above the dam at Amoskeag Falls passes into a system of canals on the left bank of the river (p. 22), supplying the power for many of the cotton mills and other factories of MANCHESTER (p. 52).

Besides cotton cloths, the products of these factories include locomotives, fire engines, woollen cloth, hosiery, clothing, paper, shoes, leather, wagons, and manufactures of wood. At NASHUA there are cotton mills which use the water power of the Nashua River, and there



FIG. 51.

Manchester. Mill tenements, the old cotton mills, the new steam mills, west of the Merrimac, and operatives' houses.

are other factories which produce a variety of goods. CONCORD owes its growth in part to being the state capital. The manufacturing interests (pp. 49, 62), although important and varied, do not equal those of some smaller cities. LACONIA, FRANKLIN, and TILTON use the power of the waters from Lake Winnepesaukee. Factories for knitting hosiery and for making knitting machinery are

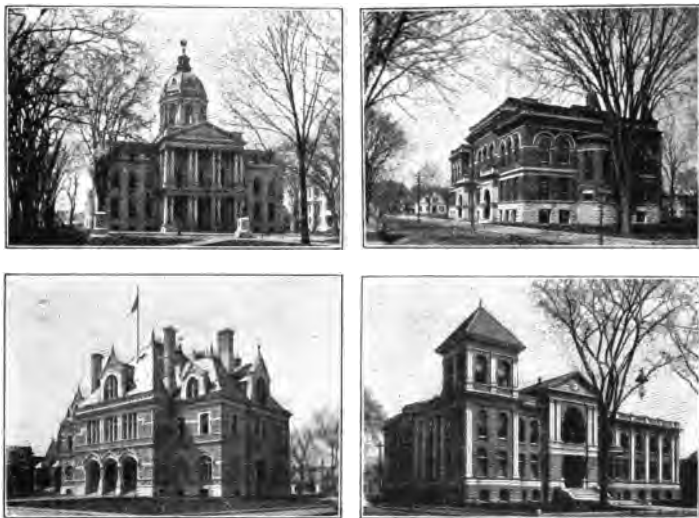


FIG. 52.

A few of the public buildings in Concord. The capitol, high school, government building of the national government, and state library.

numerous in Laconia. There are cotton mills at **SUNCOOK**.

**Upland and Valleys.** — The towns of the upland in the southern part of the state number but a few hundred people each. Like most upland farming towns of New England, they are slowly losing population. The total population for the state, however, increases because of the great gains in the cities (pp. 123, 124). There are many waterfalls on the small rivers which descend through narrow valleys to the Connecticut and Merrimac. Railways follow the valleys, and since water power and ease of communication are there combined, the largest villages are found in these valleys. In the villages along the Ashue-

lot, Contoocook, Suncook, and Sugar rivers there are small manufacturing plants producing woollen and cotton cloth, machinery, cutlery, shoes, and other goods. There are many small lumber mills which work up the timber cut on the upland and mountains. In addition to lumber a great variety of wooden wares — furniture, chairs, pails, rakes, bobbins, shoe pegs, etc. — are manufactured.

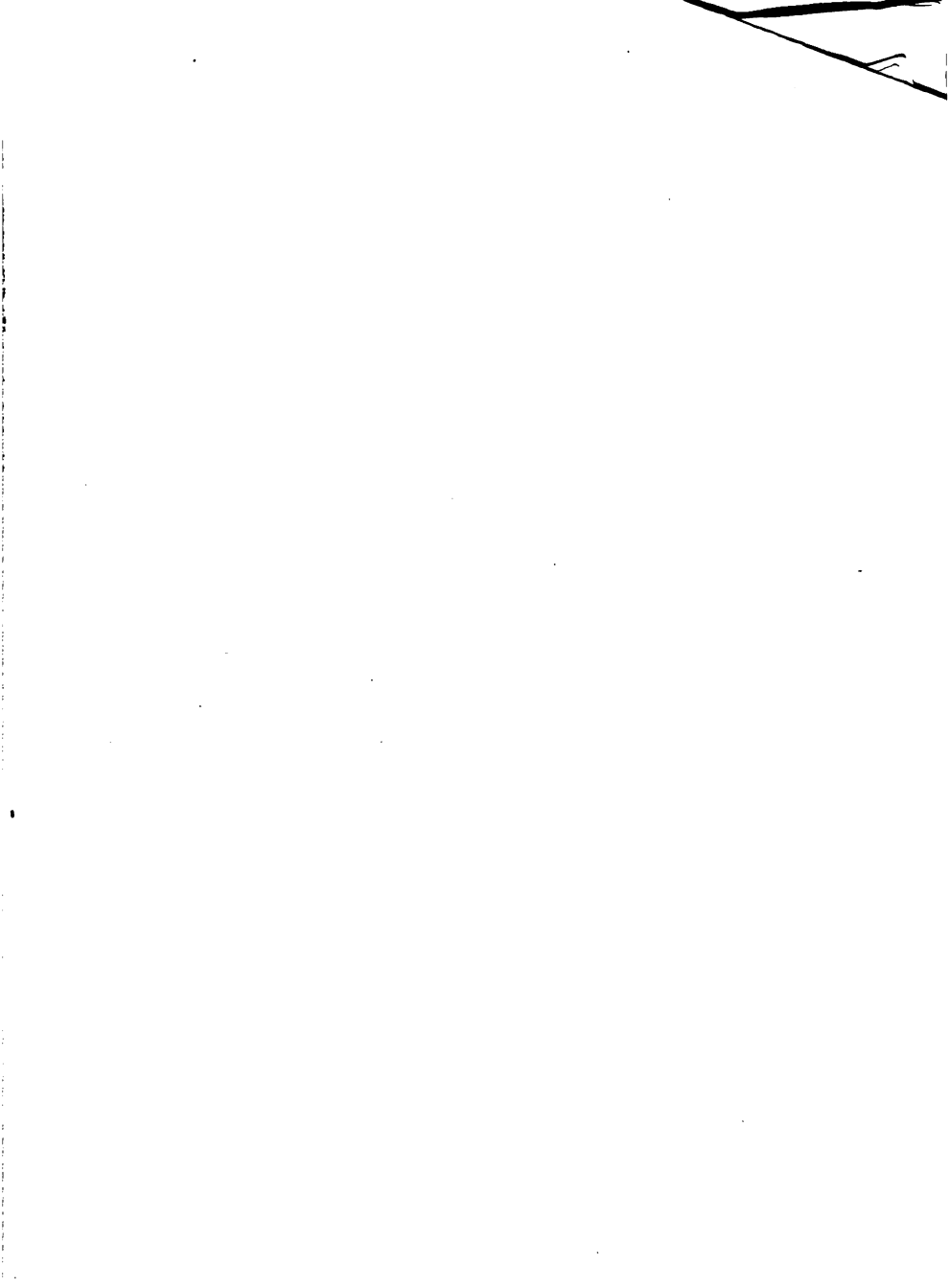


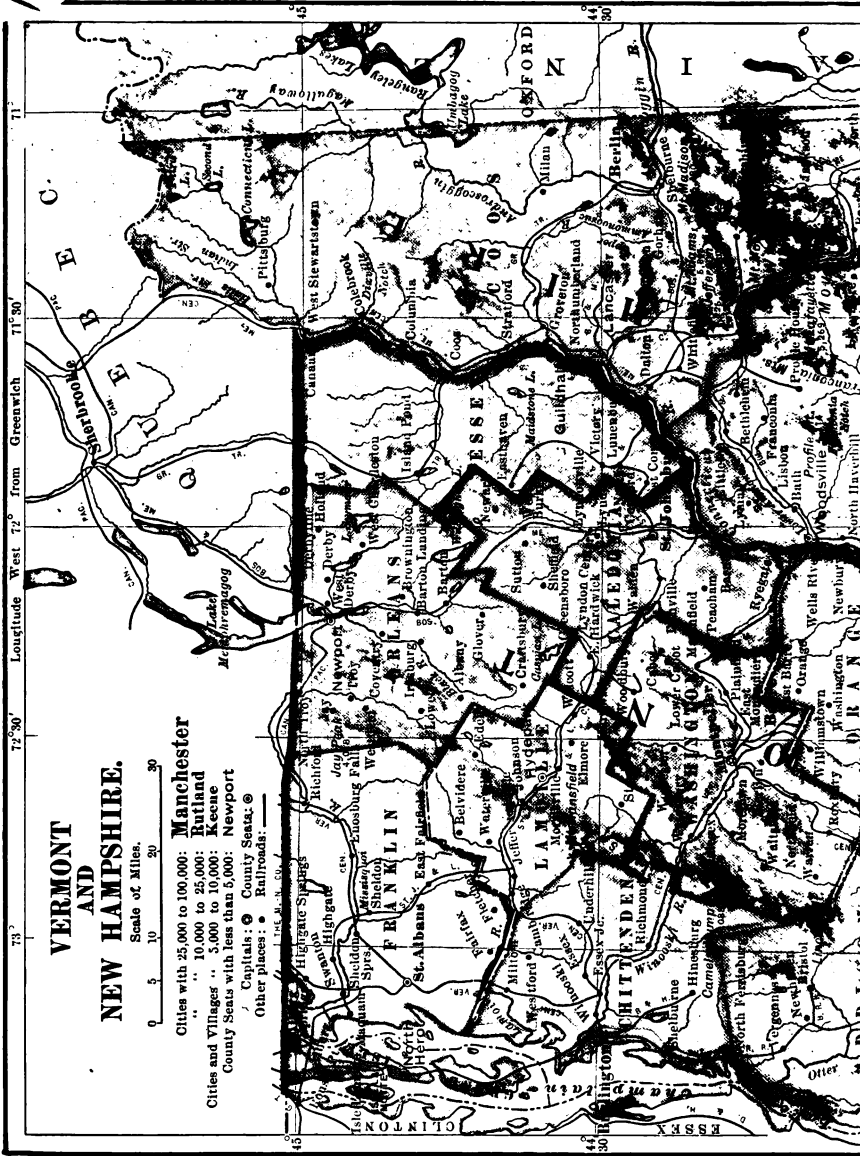
FIG. 53.

Upland of southern New Hampshire, north from Crotchett Mountain.

There are granite quarries in many towns, but those most worked are near the railways, notably at CONCORD and MILFORD. The "redstone" quarries of CONWAY are the largest. The mica mines of southern Grafton County are the most important in the United States.

Towns like CLAREMONT and LEBANON, situated where tributaries join the Connecticut, combine the advantages of good soil, water power on the tributary stream, and the trade of villages on the valley roads. The city of







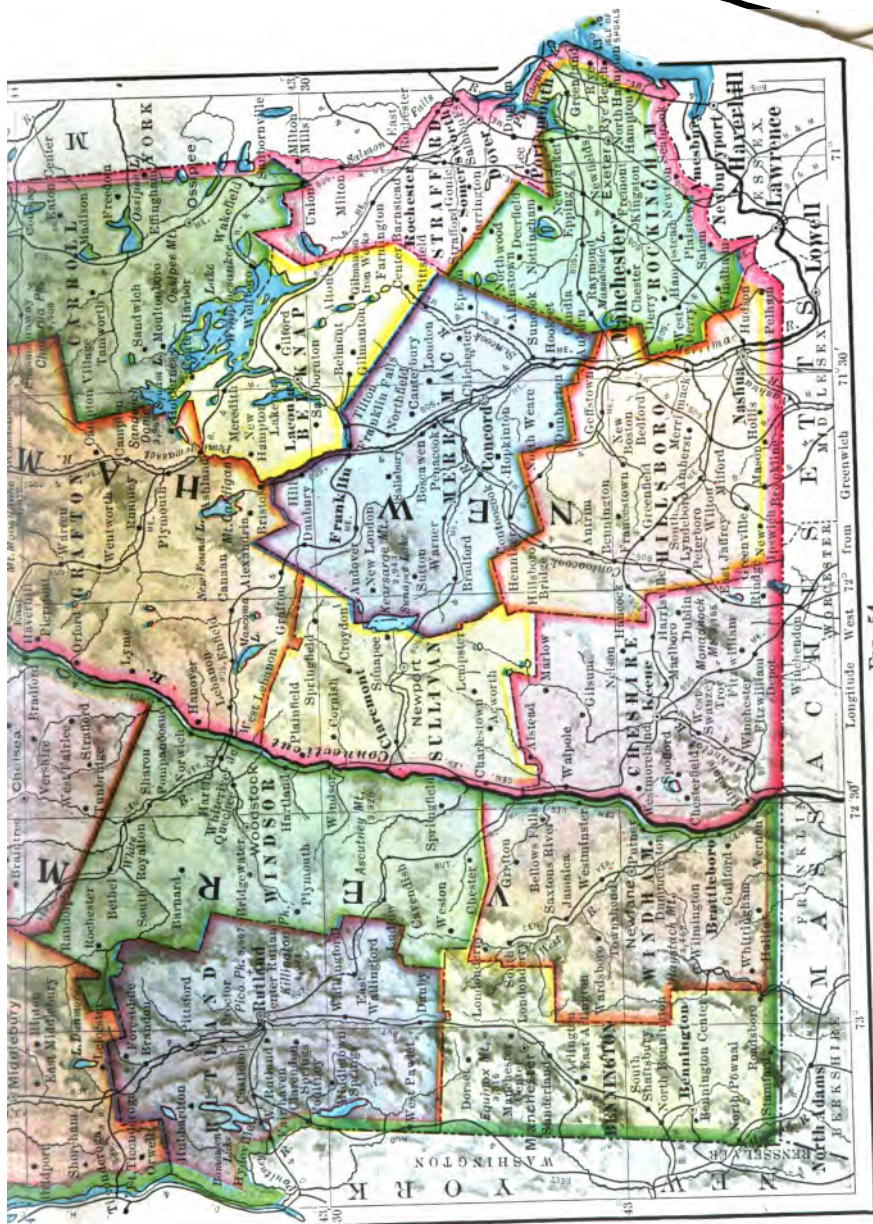


FIG. 54.

Longitude West 72° from Greenwich 71° 30'

72°



KEENE has similar advantages, where several valleys centre in the basin of the Ashuelot River. Other thriving towns are NEWPORT, near Claremont, and MILFORD, near Nashua. HANOVER is the seat of Dartmouth College, an old and important institution.

While the White Mountains are peculiarly characteristic of New Hampshire, other parts of the state are closely related to the adjacent sections of adjoining states. The northern part resembles central Maine; the industries of the Piedmont district and the southern uplands are like those of the neighboring portions of Massachusetts; and the western central section shares in the agricultural interests of Vermont. The towns reaching back from the fertile terraces of the Connecticut valley have fine dairy farms, and over half the creameries of the state (p. 102) are near the Vermont border, mainly in the line of valley towns from CLAREMONT to LANCASTER. The upland towns produce much maple sugar and syrup (p. 103).

## VERMONT

**Agriculture.** — Agriculture is the most important industry of the "Green Mountain State," for manufacturing is less developed there than near the seacoast, where transportation of supplies and products has long been easy. The entertainment of summer boarders in towns favorably situated on lake shores or among the mountains is an important industry of Vermont (p. 28).

The rugged and forested highlands of the Green Mountains form a belt ten or twenty miles wide at the south, and separated into two ranges at the north (Fig. 4), like the letter Y. Mt. Mansfield and several other well-known peaks rise over four thousand feet above sea level. The upland of central and northwestern Vermont, from which

these mountains rise, is better tilled, and occupied than most upland districts of New England. The best farms, however, are in the valleys, some of the more fertile soils being on the terraces (p. 10) of the Connecticut valley. On the west is the broad lowland in which lies Lake Champlain, and which extends from Canada southward to the Hudson valley. Throughout the level lands which border the shores of this lake and extend up the Otter Creek valley, the farms are large, and the clayey soil yields abundant crops of grain and hay. Apples and other fruits bring large returns, for the westerly winds from over the lake tend to prevent early frosts.

Since Vermont has few cities, and the smallest population of any New England state (pp. 123- and 128), her farm products must find a market abroad, to make return for the manufactured goods purchased. In early times the crops were fed to large flocks of sheep, and wool was exported; but to-day butter and cheese are the leading products. These interests have given origin to stock farms. The Merino sheep and Morgan horses raised in the Otter valley won a high reputation in the past. While the number of Vermont sheep has decreased to one-fifth of the former total, the Merino blood has so improved them that an average fleece weighs three times as much as in former days. Driving horses are again being carefully bred on some Vermont farms. A considerable use of thoroughbred dairy stock (p. 45) has so improved the cattle of the state that the average yield of butter per cow is somewhat larger than in any other state.

**Dairying.** — Not long ago the old-fashioned dasher churn (Fig. 55) and the wooden cheese press were as common on farms as the spinning-wheel and loom in still earlier times;

but to-day nearly all the cheese is made in cheese factories, and much butter in the creameries. Improved processes and machinery, under expert care, produce butter and cheese of high excellence, which command a higher price in the open market than similar products gathered from small farms.



FIG. 55.

Making butter on the farm. What is the use of each object in the picture?

There are some seventy cheese factories in the state, mainly in its southern third, and nearly two hundred creameries.



FIG. 56.

A Franklin County skimming station.

The Franklin County creamery (Fig. 57) at St. ALBANS is one of the largest in the world, making at times more than ten tons of butter in a day. To supply this creamery there are many skimming stations in the vil-

lages for miles around. To these the farmers bring their milk to be skimmed, and the cream is sent by train or wagon to the creamery.

When milk is placed in shallow pans in a cool place, or in deep, narrow cans in cold water, the light *globules of fat* slowly rise as

*cream*. More cream, however, is secured by the use of *separators*, and the separation takes place at once. In these machines a stream of milk enters a rapidly revolving metal bowl, having two outlets, one from near the centre for the cream, another for the heavier *skim milk*, which is forced toward the outside because of the rapid revolution. The cream



FIG. 57.

Creamery, St. Albans. Rotary churns.

is then set in cold water for some hours in order that the butter may be firm; and after this the temperature is slowly raised to ripen or sour the cream enough to flavor the butter. The cream is placed in the great revolving churns of the creamery, in which the fat particles become united into little masses of butter. The blue, watery *buttermilk* is then drawn off, and the butter is twice rinsed in clear water. After this the butter is worked about in a machine to press out most of the water and to flavor it evenly with salt. It is then moulded into "prints" or packed in wooden tubs.

Cheese contains the curd as well as the fat, and these together amount to about half of the solids of milk. The *casein* or *curd* is an albuminous substance, like lean meat, held in solution in the fresh milk. Most of the water is removed in cheese manufacture, leaving the cheese composed of about a third each of water, fat, and casein. When thus condensed, the milk solids may be readily preserved and transported.

**The Forests.** — Lumbering is a leading occupation in the northeastern counties. In this section forests cover much of the upland, as they do across the border in Canada and New Hampshire. NEWPORT on Lake Memphremagog is a centre for the lumber trade. Small mills in many towns raise the sum total of manufactures of wood in Vermont to a value of over four million dollars. Sawmill machinery is made in MONTPELIER. Very many farms have orchards of sugar maples, and Vermont produces more and better maple sugar than any other state.

In late winter, when the warm sun starts the sap, the maples are tapped with small augers, and the sap which flows forth is collected. It is then boiled down until enough water has evaporated for the sugar to crystallize as the syrup cools. Formerly the sap was caught in wooden troughs, collected by men on snow-shoes, and boiled in iron kettles over open fires, yielding dark, dirty sugar. Now the sap is drawn from the woods on tank sleds, or is conducted through lines of piping, to comfortable sugar houses. Here it is rapidly boiled in covered evaporators, giving clean and toothsome syrup and sugar.

**Quarries.** — The expansion of railways along the valleys of Vermont has led to the development of quarrying and some manufacturing, by affording an outlet for products. In Rutland County a belt of slate rocks extends southward from FAIR HAVEN to POULTNEY, and westward into New York State. The Vermont quarries produce more

slate (p. 108) than those of any other state except Pennsylvania. Some of the green slate contains so little iron oxide that it does not turn brown on exposure to the air, and much of this is exported to other continents.

Crossing the Taconic range from the slate belt, one comes to the limestone and marble formation that extends northward along the Otter and Champlain valleys. Vermont produces more marble than any other state, and nearly all that is used for monuments. Quarries were opened soon after the Revolution, and over half the marble used in the country since that time has come from Vermont. RUTLAND is the business centre of the industry, and the most important quarries are in neighboring towns, such as WEST RUTLAND, PROCTOR, and BRANDON.

The marble quarries are deep rectangular pits. On their level floors are movable railways on which are channelling machines for cutting long, deep grooves in the marble floor by blows of vertical chisels. Series of holes are then drilled by another machine, marking off the stone into blocks, which are separated by the use of iron wedges, since blasting would injure the marble. At the mills the blocks are sawed into slabs. For this purpose, sand, borne by a stream of water, is ground against a block of marble by means of strips of soft iron, held in a frame and moved back and forth with their edges on the stone. This wears narrow grooves that finally divide the blocks into slabs. With the aid of sand, other machines turn and shape, smooth and polish, the marble, much as wood is moulded and finished for use.

Beautiful variegated and black marbles are quarried in the northwestern corner of the state, but they are so hard that it costs more to shape and polish them. Limestone is quarried in some places for building purposes, or is burned for lime.

Granite of varying color and texture is quarried in a number of Vermont towns, and BARRE now leads all



other places in the production of fine granite for monuments. Much granite is exported in rough blocks to be wrought in other states. Besides the workmen in the quarry villages about Barre, more than fifteen hundred skilled men are engaged in cutting and polishing monuments and blocks at the many extensive works in the city.

**Cities.** — BURLINGTON, on Lake Champlain, the largest city of the state, has developed as a central lake port. At first the goods received from steamers and by canal boats from the Hudson and St. Lawrence valleys were sent from Burlington to the towns farther east in great eight-horse wagons. Afterwards railways were built from the lake up the Otter, Lamoille, Winooski, and Missisquoi valleys, and over the divide to the Connecticut valley.

Lumber from Canada is brought to Burlington to be planed and cut for use, and the city is one of the large lumber markets of the country. Some of the lumber is here made into doors, sashes, blinds, shade rollers, and furniture. The city is an important trade centre for the country round about, with large wholesale and retail stores; and naturally (p. 65) there are varied manufactures, notably of machinery, shoes, and patent medicines. The water power of the Winooski River is used by woollen mills in the village of Winooski and by cotton mills in Burlington. The city has fine public buildings and residences, which command beautiful lake and mountain views. It is the seat of the University of Vermont.

To the north is ST. ALBANS, a leading butter market, and the seat of manufacturing interests. The offices and shops (p. 62) of the Central Vermont Railway are located there. MONTPELIER, the state capital, is farther east in the Winooski valley; and nearby is BARRE. Each city has

## NEW ENGLAND

water power which is used by several factories. NORTH-FIELD is the seat of Norwich University. To the south, factories in RUTLAND produce weighing scales, car wheels (p. 61), and farm tools. The sixth city of the state, and both the oldest and smallest city of New England, is VERGENNES. When, in early days, most of the population was in southern Vermont, it was an important trading point, because it was situated at the head of lake navigation on Otter Creek. MIDDLEBURY is the seat of Middle-

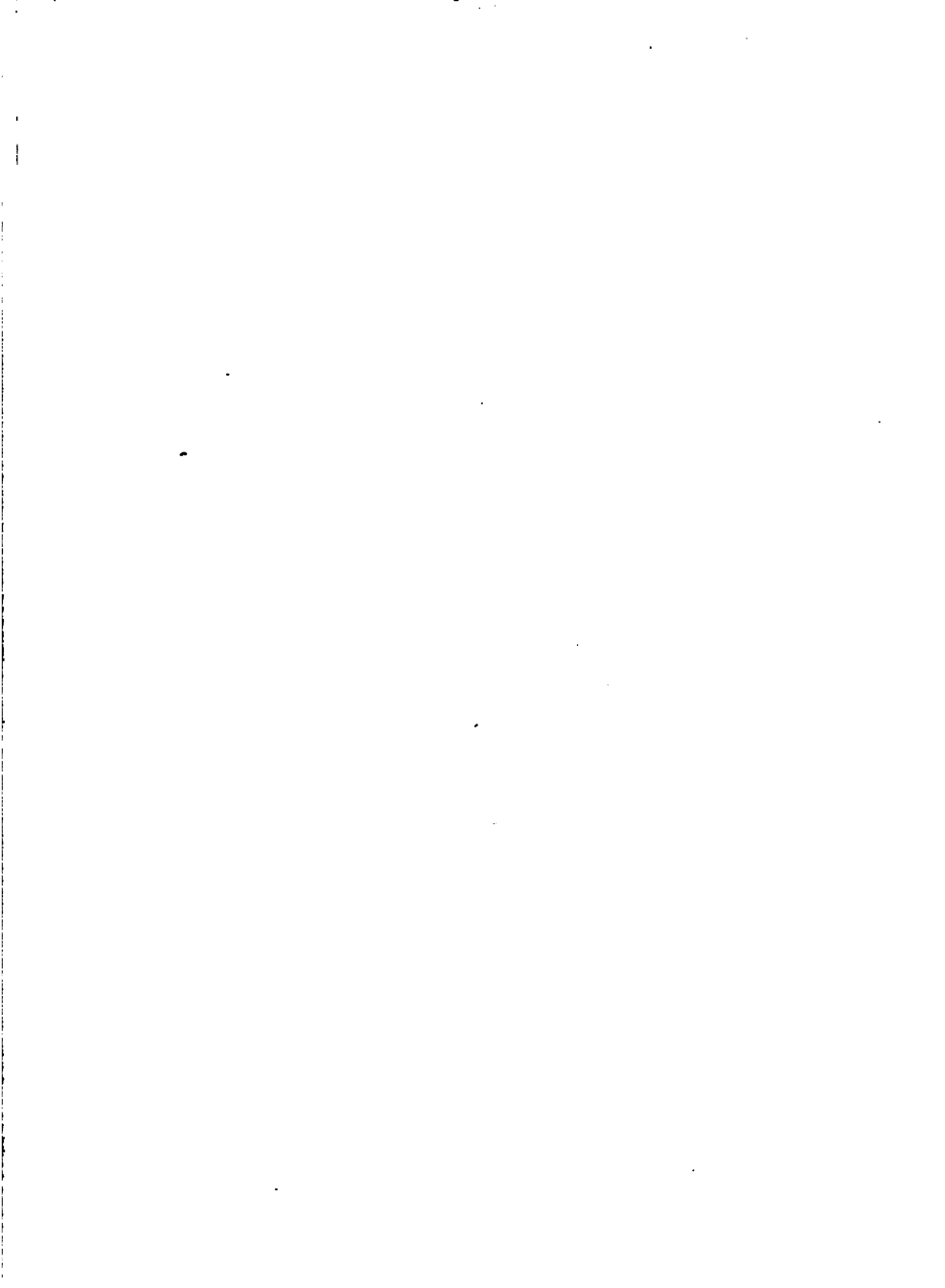


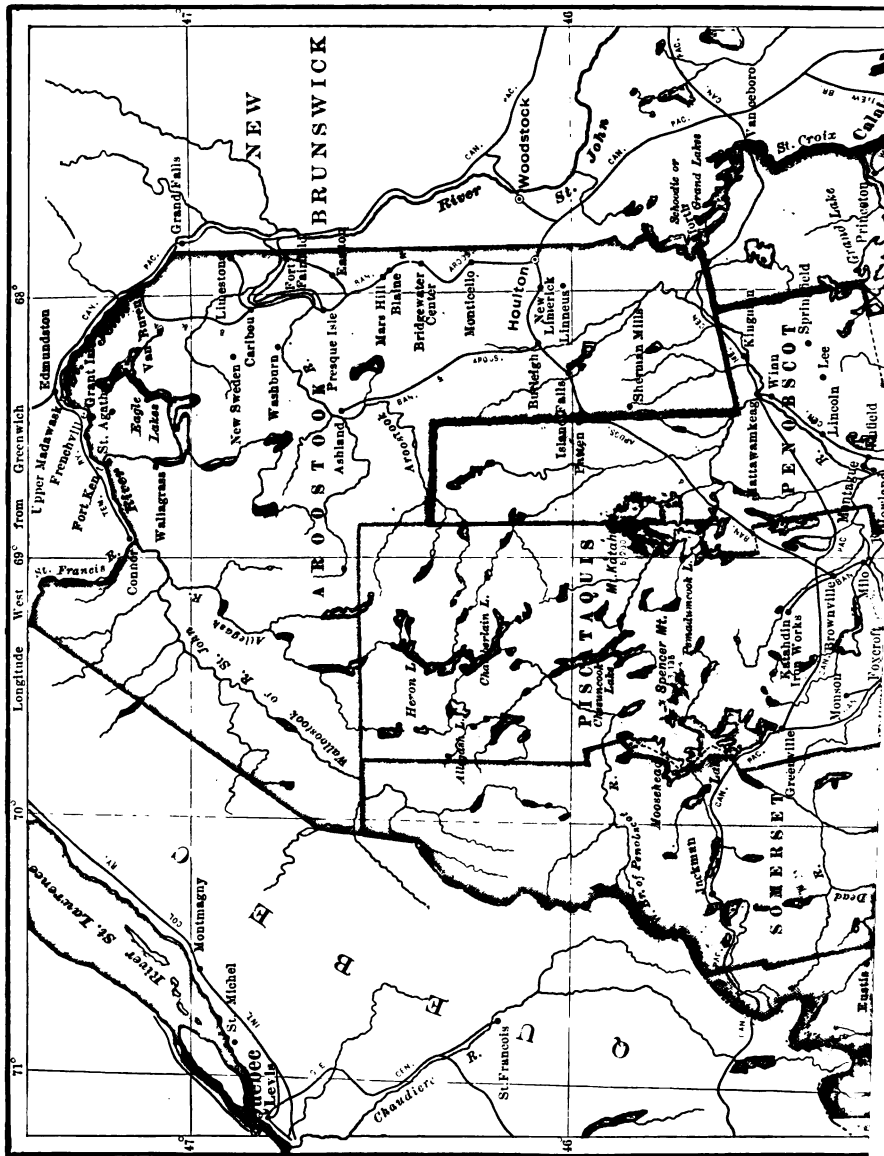
FIG. 58.

Montpelier. Find the Capitol. Describe the situation of the city.

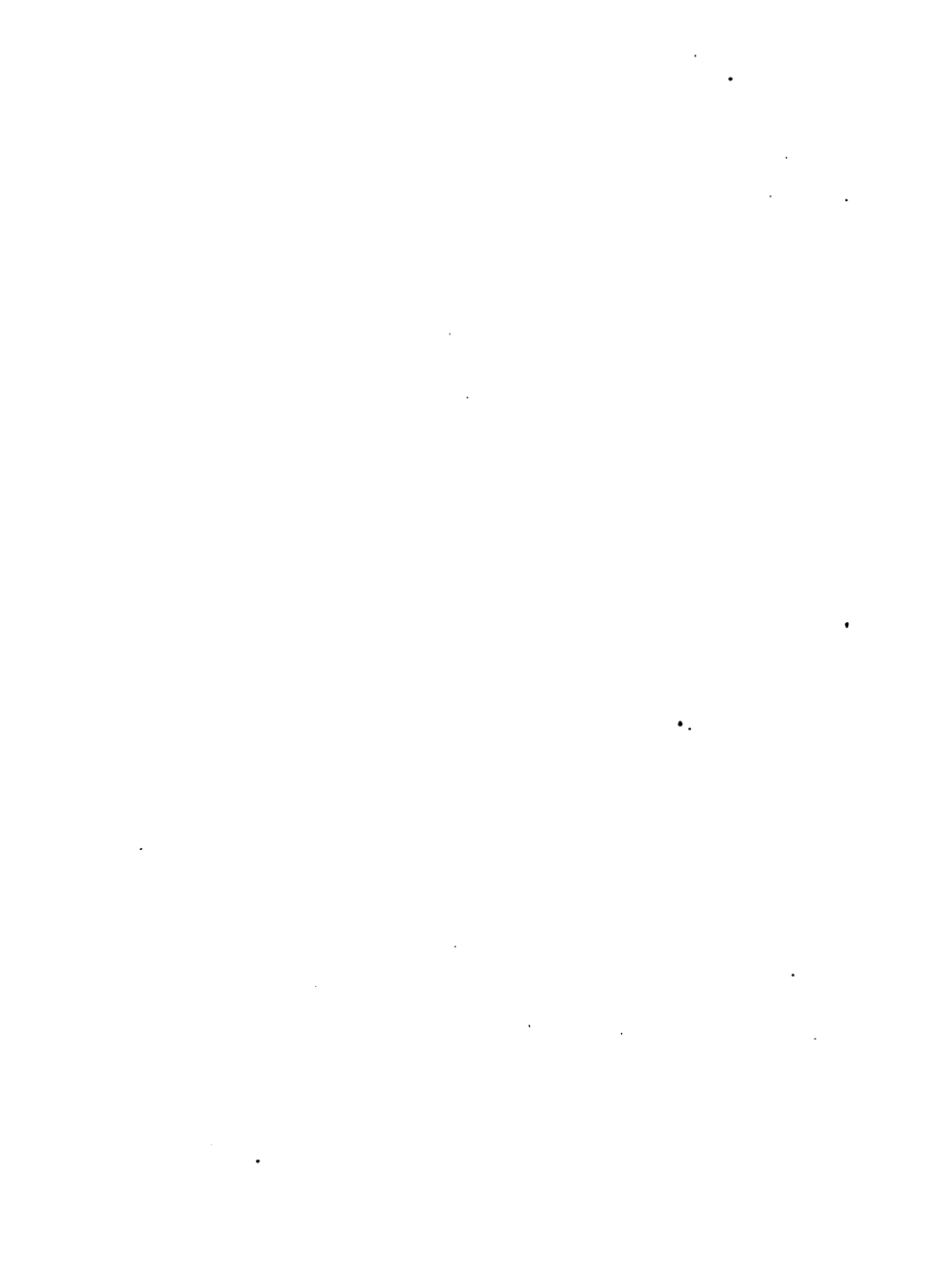
bury College. The historic town of BENNINGTON, with its battle monument, is still farther south. Some of its people are employed in hosiery mills.

There are several important manufacturing towns in eastern Vermont. ST. JOHNSBURY has the largest scale works in operation anywhere, and Vermont scales are the standard in many countries. There are a number of small woollen mills (p. 54) and other factories in towns on tributaries of the Connecticut River. At BELLOWS FALLS the water power of the main river is used in manufacturing paper, machinery for creameries, farming machinery, and









other goods. The trade centre of BRATTLEBORO, with its great manufactory of reed organs, has developed at the point where West River joins the Connecticut River.

### MAINE

**Central and Eastern Maine.** — Maine, the “Pine Tree State,” has one-half the area but only one-eighth the population of New England. Much of the northern and eastern sections, covered by a vast forest, are uninhabited.

In the great mills, on the falls of the large rivers, pulp and chemical fibre for paper, boards and beams, shingles and laths, and other like products, are manufactured from spruce and pine (pp. 38—42). BANGOR, the third city of Maine in size, and the neighboring places of BREWER, OLDTOWN, and ORONO, receive the lumber floated down the Penobscot, convert it into varied products in wood and paper, and ship them away by water and rail. There are other secondary interests in these places, such as the manufacture of shoes, machinery, and woollen cloth. CALAIS, with like industries, is similarly placed on the St. Croix River. The same manufactures are also prominent at the seaports of BELFAST and ELLSWORTH in eastern Maine. The University of Maine is at ORONO.

There are many mills along the little streams of the upland in which both hard and soft wood are sawed and turned into small articles and novelties. There are large wood novelty works at FARMINGTON and PARIS in western Maine. The varied products of these mills include such articles as furniture, sleds, druggists' boxes, handles, toys, clothes-pins, checkers, toothpicks, and bicycle rims. Woollen mills (p. 54) are found in some towns; for instance, at DEXTER and at villages on the Piscataquis River. Besides valuable granite quarries on the

upland and in its valleys, there are fine slate quarries in several towns of Piscataquis County, producing roofing slate and slabs of rough stone for mill stock. In the slate mill at PORTLAND these are sawed, planed, drilled, and shaped for use as interior finish and furniture for buildings.

Fifty miles back from the coast there is a belt of country producing much fine white birch wood, many thousands of



FIG. 60.

Hunters' camp in the Maine woods.

cords of which are used yearly for spools. Spool wood is sawed into square strips, or bars, and then left in piles to dry. These strips are fed into automatic machines, which quickly turn them into spools of exact size. Nearly half of the spool bars are shipped from Portland and Bangor to Scotland, where they are made into spools.

Mountains rise above the rugged upland, and from their summits one may see the many lakes of the wilderness, gleaming like silver amid the dark forests. There are many deer and moose and a few caribou in these wild lands. The deer and moose are protected most of the year by state laws, and



the shooting of caribou has been prohibited for several years. During the open season, in the fall, thousands of sportsmen from the cities spend a week or more at camps on remote lakes, enjoying the crisp air, the beauty of the woodlands, and the excitement of hunting big game. Nearly two thousand men are registered as guides, and many taxidermists are employed in preparing skins, heads, and antlers as trophies.

The lakes and streams, well stocked with trout and other fish, attract many anglers. With guides, they often take long canoe trips,—for example, through the lake district of Washington County, or down the west branch of the Penobscot from the “carry” at the head of Moosehead Lake.

The northern boundary of Maine was not determined exactly until 1842, and that part of the state was not directly connected with southern Maine until quite recently, when the Bangor and Aroostook railway line was built. This section has still some characteristics of the frontier, for, unlike the rest of agricultural New England, it is increasing in population, as new land in the valleys is cleared and cultivated. The loose, open soil of glacial drift is easily tilled, and the gently rolling surface allows the use of farm machinery. Wheat and other grains are raised and flour is made in local grist mills; but potatoes are the principal farm product in Aroostook County.



FIG. 61.

A doe in winter.

The potatoes are planted, cultivated, and dug by machines drawn by horses. The best potatoes are usually sold for food, or to be used as seed potatoes in other states; but the smaller ones are taken to the starch factories. There the potatoes

pass through machines which wash them and grate them to pulp. The starch granules are washed from the pulp into tanks, where they are allowed to settle. After another washing, the white starch is thoroughly dried, and later barrelled for sale. Potato starch is used as sizing for giving a smooth, firm surface to warp yarns and to cloth.

Railways have led to the growth of towns as trading and manufacturing centres for the agricultural lands of the valleys and the lumber camps of the upland. The more important are HOULTON at the south, and CARIBOU, FORT FAIRFIELD, and PRESQUE ISLE in the Aroostook valley. Many sparsely settled townships are organized as plantations, but do not have the full powers of towns.

**Southwestern Maine.** — The southwestern section presents a marked contrast to the rest of the state. This corner of Maine has long been settled. It contains half the population of the state, and most of the cities and large towns (Fig. 15). PORTLAND has a large, deep, and safe harbor on Casco Bay, and is by far the largest city of the state. It is a port for steamships which transport grain, cattle, and other products, received from one of the Canadian railways, to Liverpool. Steamship lines connect Portland with the leading American coast cities, and the railways radiate to the manufacturing cities and towns at the falls of the large rivers of Maine (p. 21). Like all important trade centres, Portland has varied manufactures (p. 65). Here are the largest foundries and machine shops in Maine, making engines and machines for lumbering, pulp making, ice cutting, quarrying, shipbuilding, farming, and other industries of the state. Half their product is sent to other parts of the country. Although Deering has been annexed to Portland, the adjoining

manufacturing cities of SOUTH PORTLAND and WEST-BROOK still have separate governments.

There are important paper and lumber mills in this section (p. 42), but the leading manufactures in most of the cities, as in those of the low coastal districts of the other New England states, are textile goods, shoes, and machinery. In York County the cities of BIDDEFORD and SACO, at the lowest falls of the Saco River, have large cotton mills and other manufacturing interests. In the town of SANFORD are important plush, worsted, and alpaca mills. North of Portland on the Androscoggin River, where falls afford good water power, is LEWISTON, with its great cotton mills and their related bleacheries and dye works (p. 52). AUBURN, the shoe city of Maine, is opposite to Lewiston. In each city there are other manufactures, such as the making of woollen cloth in Lewiston and of agricultural implements in Auburn. Bates College is at Lewiston. BRUNSWICK, with its cotton mills and pulp mill, is situated where falls of the river enter tidewater. It is the seat of Bowdoin College, the oldest college in the state. There are woollen mills at LISBON. Other manufacturing villages, such as RUMFORD and JAY, are above Lewiston on the Androscoggin.

AUGUSTA, the state capital, has the advantage of water power and a waterway to the ocean (p. 23), and is the largest city on the Kennebec River. Besides being a trade centre for the valley, it has both cotton and paper mills. There are other manufacturing communities along the Kennebec, with varied products. WATERTVILLE, SKOWHEGAN, and FAIRFIELD are above Augusta, while GARDNER and HALLOWELL are on tide water. Waterville is the seat of Colby University.

Agriculture is the leading industry in the many thinly populated towns south of the forests of Maine. Near the cities milk, butter, vegetables, and other farm products find ready sale. Farther into the country there are many creameries, producing cream and butter, and some cheese factories (p. 102). Famous horses have been reared on Maine stock farms, and the business is now a profitable one. Sheep are often kept for their mutton and wool. There are large orchards on many farms, and fine winter apples are exported. Much farm produce is canned for sale. There are about seventy canneries, which pack many thousand cases of apples, blueberries, squashes, and other produce. More corn is canned in Maine than in any other state except New York and Illinois.

The owners of canneries sell seed corn to the farmers, and agree to buy their crop of sweet corn at a certain price. In the early fall the ears are carted to the canneries, where all who wish may share in the work of husking. Machines are used to cut off the milky kernels. These are sweetened, cooked, and placed in cans, which are sealed while yet steaming. The cans of corn are cooked again in steam retorts, cooled, labelled, and packed in boxes for sale.

**Coast.** — South of Portland the coast is but slightly indented, and the sandy beaches of OLD ORCHARD, YORK, and other towns are well-known summer resorts. From Casco Bay eastward the coast line is very irregular, and many lighthouses are needed to warn ships away from the rocky islets and reefs. Fishing, shipbuilding, and commerce once brought prosperity to most towns on the islands and long peninsulas; but conditions have changed here, as on the uplands, and the census of 1900 showed a decrease in population for most places in the four coast

counties of Lincoln, Knox, Waldo, and Hancock. However, the little steamers that thread the channels among the islands bring many summer residents to this bold, picturesque coast, and some places have become prosperous through supplying the wants of cottagers and boarders. BAR HARBOR on Mount Desert Island is a famous resort, and many points from the islands of Casco Bay to Calais share the popular favor. Summer boarders also frequent the interior towns of Maine, and this state, like New Hampshire (p. 94), celebrates "Old Home Week."

As the industries of the coast towns have become centred at places with good railway connections, many of the young people have sought work in the larger cities. Once every coast village sent schooners to the fishing banks; now they sail only from Portland and a few small ports. The shore fisheries of Maine, however, have increased in importance, and more than seventy factories are engaged in canning small herring, lobsters, and clams. Many of the canning factories are at EASTPORT and LUBEC on Passamaquoddy Bay.



FIG. 62.

A fisherman, dory, and lobster pots.

In Europe little fishes have long been canned as sardines, and since 1875 the industry has developed here. When herring are feeding they swim at the surface of the tidal currents,

and may be caught in *weirs*. These are closely woven brush fences built out from the shore to direct the fish toward a netted enclosure in which they are entrapped. There they swim about in circles until dipped out at low tide. Small steamers collect the catch, and the factory whistles call men, women, and children to the work of cleaning and canning the fish while fresh. The cleaned fish are soaked in brine, dried on wire flakes, cooked in hot oil for two or three minutes, and packed in oil in small tin boxes. Often the fish are quickly dried and cooked in the hot air of ovens. Somewhat larger herring are packed in mustard, and full-grown fish are smoked.

BATH is the shipbuilding city of Maine. Its deep, safe harbor receives the lumber for vessels from both the Kennebec and Androscoggin rivers, and the energy of its citizens has developed two plants for the building of steel ships, notwithstanding the distance from coal and iron. War ships are built, as well as steamers, schooners, and barges for the coasting trade. Not only here and at CAMDEN, but also at ROCKLAND, BELFAST, WALDOBORO, and other deep harbors, the industry has revived.

The location of granite quarries, lime kilns, and brick-yards along the coast is important, since the products may be easily shipped to the great coast cities. The deposits of glacial clays (p. 10) are extensive, and formerly brick was largely exported. Quarries at HALLOWELL, VINAL HAVEN and other points furnish much granite for buildings and paving stones. The inexhaustible limestone beds in ROCKLAND and adjoining towns have been worked for two centuries, and the lime produced exceeds in value the total output of any other state.

Great changes in the methods of quarrying and burning lime, brought about by sharp competition, have resulted in giving a cheaper and better product. Once the rock was drilled by

hand, blasted with powder, hauled to the kilns in ox carts, and burned for several days with wood. Now power drills, run by compressed air, prepare the holes for the dynamite used. The rock is raised on electric cable ways to cars that run to the kilns at the wharves. By the use of soft coal and a forced draft, the lime is burned in modern kilns in a single day.

Ice is another export from the coast section. The winters of Maine are so long and cold that thick ice forms in the estuaries, and on the lakes near the coast, whence it may be profitably exported in vessels.

The large rivers contain fresh water far below the point where the tides rise in their drowned valleys. During the ice harvest, several thousand men and many horses are busy on the Kennebec and Penobscot rivers. The loose snow is easily removed, but that which is frozen to the ice has to be planed off. The clear ice is then grooved into square blocks, which are floated to the great storehouses. Here they are raised on inclined ways by steam power and packed away. The ice houses have been purchased by the company which supplies ice to New York and Philadelphia.

### REVIEW QUESTIONS

PHYSIOGRAPHY AND CLIMATE.—(1) State the position of the New England States. (2) State their area. (3) What about their population? (4) Describe the relief. (5) Relate the history of the upland. (6) Describe the valleys. (7) Describe the mountains. (8) How are relief and population related? (9) Describe the lowland basins and their formation. (10) Compare the New England upland and the southern Piedmont. (11) Describe the glacial moraines. (12) Describe the glacial soil. (13) Tell about drumlins. (14) Tell about sand plains. (15) How did the glacier affect the drainage? (16) How were the terraced plains and the associated falls formed? (17) Why are the falls of New England important? (18) State the character of the coast and its effect on industries. (19) Tell the story of coast formation. (20) Describe the more recent changes. (21) What does our government do on the coast to aid commerce? (22) Give an account of New England temperatures, with causes and effects.

- (23) Describe the effects of cyclonic storms on the weather.  
(24) What is the characteristic summer weather?

**SOCIAL AND INDUSTRIAL DEVELOPMENT.**—(1) Tell the story of the settlement of New England. (2) Describe the character of the settlers. (3) What led to the formation of several colonies? (4) What were the steps in the extension of the frontier? (5) Describe life on the frontier. (6) Give an account of the beginnings of commerce. (7) What seaports rose to importance? Why many? (8) Sketch the development of shipbuilding. (9) What effect had the building of railways on seaports? (10) Why were factories built? With what effect on population? (11) Relate the causes leading to the growth of manufacturing cities like Lowell. (12) Like Salem. (13) Hartford. (14) Fall River. (15) Worcester. (16) Meriden. (17) Tell the story of the extension of railways and their relation to relief of the land. (18) Tell about the combination of the railways. (19) What are some of the causes and effects of the decrease of population on the uplands? (20) What influences are bringing prosperity to some country districts? (21) Describe the development of roads. (22) Describe state roads. (23) What effects has the summer vacation system had on country towns? (24) Tell about the races that have come to New England cities. (25) Describe city tenement life. (26) What did the settlers do for education? (27) Give an account of the district schools and academies. (28) What has been done to improve the school system in recent years? (29) Of what value is free education to New England?

**INDUSTRIES. Fishing.**—(1) Speak of the importance of the fisheries. (2) Recount the development of the industry. (3) At what ports does it centre? (4) Tell about the coast summer resorts. (5) Describe the method of catching cod and halibut. (6) Tell about their preparation for market. (7) Describe the life of a fisherman. (8) How are mackerel caught?

**Lumbering.**—(9) Contrast the woodlands of southern New England in colonial days and now. (10) Give an account of the Maine forest and its value. (11) Describe the methods of logging. (12) Tell about the life of the lumbermen. (13) Describe driving. (14) What are the principal lumber products? (15) Tell about centres of lumber manufacture. (16) The methods of manufacture. (17) The shipment of lumber. (18) How is paper made from wood? (19) How important is this industry? (20) Where are pulp mills placed?

**Agriculture.**—(21) Contrast the past and present importance of farming. (22) Contrast past and present methods. (23) Why



are dairy farms and market gardens so important? (24) Compare the cows of colonial days with present dairy herds. (25) How are cows fed? (26) How is milk marketed? (27) Describe the work of a market gardener in winter. (28) Describe his work in summer. (29) What are leading farm and garden products?

*Quarrying.*—(30) Why is quarrying important in New England? (31) For what is granite used, and why? (32) How is it quarried and cut for use? (33) Where are the most important granite quarries?

*Textile Manufactures.*—(34) Why was cloth made in the colonies? (35) How was it made? (36) Relate the development of textile manufacturing. (37) Relate the development of cotton manufacturing in and near Rhode Island. (38) Tell about the mill cities north of Boston. (39) What about cotton manufacturing in Fall River? (40) Name and locate the important centres of cotton manufacture. (41) What are the products of cotton mills? (42) What changes in cotton manufacturing are now continuing? (43) How is woollen manufacturing distributed, and why? (44) Where is the manufacture of worsted goods centred? (45) How do woollen and worsted goods differ? (46) What different kinds of mills are engaged in cloth manufacture? (47) Give an account of carpet manufacture. (48) Tell about cotton thread; knit goods; manufactures of linen; of silk.

*Shoe Manufacture.*—(49) Tell about tanning in colonial times. (50) Tell about its present distribution. (51) Describe the early manufacture of shoes; the development of the industry. (52) What has been the effect of the introduction of machinery? (53) Describe the distribution of shoe factories and centres of production. (54) Where are rubber shoes made?

*Manufactures of Metals.*—(55) Tell about the early iron industry. (56) Why are there no important mines here to-day? (57) What kinds of metal goods are now made here, and why? (58) Name and locate the centres. (59) Why is the manufacture of machinery important? (60) Where are different kinds of vehicles made?

*Commerce.*—(61) In what respects are smaller and larger centres of trade alike? (62) What different causes have led to the growth of Boston? (63) Describe its business as a wool market; a cotton market; a financial centre; a shoe and leather market. (64) Why do large trade centres have many and varied industries? (65) What foods are prepared for sale in and near Boston?

**MASSACHUSETTS.**—(1) What is the population of Massachusetts? (2) How is it distributed? (3) Describe the physiography of the Boston Basin. (4) Recount the growth of cities at the head of Boston

Harbor, and its causes. (5) Tell about the Metropolitan commissions. (6) Give an account of the circle of communities outside the Boston Basin. (7) Name, locate, and give important facts about the cities of the Merrimac valley. (8) Tell about Worcester and its neighbors. (9) Do the same for the cities of Bristol County. (10) For what are Plymouth and Gloucester important? (11) Tell about Cape Cod and its life. (12) Tell about whale fishing. (13) Describe the raising of cranberries. (14) Account for the distribution of population in western Massachusetts. (15) Name, locate, and tell about the important places in the Connecticut valley. (16) How is paper made from rags? (17) Tell about the towns of the central upland and its valleys. (18) Tell about places in the Berkshire valley.

**RHODE ISLAND.** — (1) Account for the density of population and its distribution? (2) What are the most important manufactured products? (3) Sketch the changes in the commerce of Providence. (4) Give an account of its manufactures. (5) Give an account of its suburban growth. (6) Tell about the important places and industries northward from Providence. (7) Do the same for places to the northwestward. (8) What important places and industries are found to the southwest of Providence? (9) Answer the same question for Bristol County. (10) Draw and describe Narragansett Bay. (11) Recount the changes in the interests of Newport. (12) Name the leading summer resorts. (13) Tell about the fisheries. (14) Contrast farming on the lowland with that of the uplands. (15) Contrast the people of the upland farms and those of the cities. (16) Describe southwestern Rhode Island; the surface; drainage; coast; industries; and largest towns.

**CONNECTICUT.** — (1) Describe the Connecticut valley lowland, and its importance. (2) Tell about agriculture on the lowland. (3) What can you say about its industrial development? (4) What is the characteristic of Connecticut manufactures? Which are most important? (5) Give an account of Hartford. (6) For what are its neighbors to the north and east important? (7) What places and industries are found to the south of Hartford? (8) Tell about New Haven,—its development, industries, and parks. (9) Describe the coast. (10) Give the leading facts about the oyster industry. (11) Name, locate, and mention important facts about the ports near Rhode Island. (12) Do the same for ports near New York. (13) Tell about the western upland and its interests. (14) Tell about the cities of the Naugatuck valley. (15) Give important facts about the manufacture of brassware. (16) For what is Danbury important?

- (17) Give an account of the eastern upland and its industries. (18) Tell about Norwich and villages in the Quinebaug valley. (19) Give an account of Willimantic and Stafford. (20) What can you tell about silk production and manufacture?

**NEW HAMPSHIRE.** — (1) Describe the mountains of New Hampshire. (2) Describe the notches of the White Mountains. (3) Tell about the summer resorts. (4) Tell about the forests and their products. (5) Give the main facts about Berlin. (6) Describe the surface of southeastern New Hampshire. (7) What are its industries and products? (8) Tell about Portsmouth and cities near it. (9) Tell about cities on the Merrimac. (10) Give an account of the southern upland. (11) Give an account of its industries and products. (12) Name, locate, and give leading facts about its towns and cities. (13) What interest leads in the Connecticut valley?

**VERMONT.** — (1) What is the most important state industry? Why? (2) Describe the sections of the state and their characteristics. (3) Why are stock farms important? (4) Give an account of the dairy industry and the manufacture of butter. (5) Tell about lumbering. (6) How is maple sugar made? (7) Tell about slate; where quarried; importance. (8) Tell about marble; where quarried; importance; how quarried and worked. (9) Tell about granite; where quarried; importance. (10) Relate the development of Burlington. (11) Describe its industries. (12) Give an account of the important places in western Vermont. (13) In eastern Vermont.

**MAINE.** — (1) Contrast Maine and Massachusetts as to area and population. (2) Give an account of Bangor and its neighbors. (3) Locate and tell about Calais, Belfast, and Ellsworth. (4) Describe the industries of central Maine. (5) Tell about the manufacture of spools. (6) Describe the forests as a game preserve. (7) What can you tell about Aroostook County and its products? (8) Tell about the raising of potatoes and manufacture of starch. (9) Give important facts about the towns of Aroostook County. (10) Contrast southwestern Maine with the rest of the state. (11) Give an account of Portland. (12) Give an account of the leading places in York County. (13) Do the same for the leading places on the Androscoggin, and on the Kennebec. (14) Tell about Maine agriculture. (15) Tell about the canning of corn. (16) Describe the coast line of Maine. (17) Describe its past and present industries. (18) Tell about the canning of fish. (19) Give the main facts about shipbuilding; about the granite industry; about the lime industry; about ice. (20) What are the important coast towns and cities and their industries?

## SUGGESTIONS

**HOME GEOGRAPHY.**—Study the geography of your own town or city while studying New England. Enlist the aid of friends. Get them to take groups of pupils on field trips and on visits to factories. Some geologist can help you to find local illustrations of the surface features named in the text. Search for the reasons for past changes and present characteristics. What has determined the location of roads and railways, and the distribution of population? Make large maps showing these features. Talk with older townsfolk, read local histories, and tell your classmates what you find about the settlement of the town and its industrial and social development. What should be done to improve your town and ensure its prosperity?

**COLLECTIONS.**—Help to make careful and detailed collections for the school to illustrate each important industry of your town. Show the raw materials used, the steps in manufacture, and the finished products. Cut from trade journals pictures of the machinery used, and place these with the specimens. Place the best description of the industry and its processes, written by any member of the class, permanently with the specimens. Arrange exchanges with other schools, and thus secure collections illustrating all important New England industries. Carefully arrange the collections in cabinets or boxes so that they will be preserved, and that they may be easily presented for study. Collections of New England minerals and woods with related pictures are valuable. Secure from townspeople for a few days a loan collection to illustrate life and industries a century ago.

**PICTURES.**—Make a collection of photographs of home scenery, and make notes beside them regarding the surface features shown and their relation to life. Secure photographs of local industries. Collect pictures of New England scenery and life, and arrange them so as to illustrate the different topics studied. Compare the pictures with maps of the same places. Good pictures are contained in the booklets of the Boston and Maine, Bangor and Aroostook, and Central Vermont railways. These are given away.

**MAPS.**—The three southern New England States, and parts of the others, have been carefully mapped by the United States Geological Survey. For \$2.00 the Director of the Survey will send from Washington one hundred assorted map sheets, which could include enough maps of the home town to give one to each pupil, and in addition others of other sections. Single sheets cost five cents. Suggestions

as to the use of these maps in elementary schools were prepared by Professor W. M. Davis, and were published by the Boards of Education of Massachusetts and Connecticut.

A school near the coast should obtain from the United States Coast and Geodetic Survey, Washington, D.C., a chart of the neighboring coast waters, and study the coast forms and their effect on industries and population. Cancelled charts of some waters, excellent for school use, may be obtained, without cost, through the member of Congress for the district in which the school is placed.

Books.—Ask the librarian to place on the reference shelves of your public library, books on the geography, history, industries, and life of New England, which will both help and interest you. The *New England Magazine* has described and illustrated the history and industries of many cities and towns. Ask the representative to the state legislature from your district to secure for the school copies of the reports of the Commissioner of Industrial Statistics and other state documents. Send to the Secretary of Agriculture, Washington, D.C., for a list of the publications of the Agricultural Department. Some of the Farmers' Bulletins tell about New England farming, and will be sent free. Secure from the state superintendent of schools, or from the last report of the United States Commissioner of Education, a list of the colleges and other higher schools of the state, and make a map showing their distribution. Send for catalogues of these schools for your school library. Which school would you prefer to attend?

Read "Good Old Times," by Elijah Kellogg, as a picture of frontier life in colonial New England. His Elm Island stories tell of early life on the coast of Maine. Read R. H. Dana's "Two Years Before the Mast." For the best pictures of New England child life in the last century, read C. D. Warner's "Being a Boy"; T. B. Aldrich's "Story of a Bad Boy"; "A New England Girlhood," by Lucy Larcom; and "A New England Boyhood" by E. E. Hale. A good account of the development of industries is given in "American Inventors and Inventions," a book written for schools by W. A. Mowry.

WRITTEN WORK.—(1) If you live in the city, write an account of a vacation in the country or at the seashore. If you live in the country, tell of a visit to the city, or about the summer visitors to your town. (2) Perhaps your teacher, through the superintendent, will arrange for the school to exchange letters with children living in different surroundings elsewhere in the state, the letters describing the home life and work of the writers. (3) Tell how the roads of your town or city are made or mended. Which are best, and why?

(4) Write a report of an address given the class, by some business man of the town, concerning the industry with which he is related.

**SPECIAL ASSIGNMENTS.**— Make a study of some topic in New England history assigned by your teacher, and report on it to the class. For instance, — early explorers; the settlement of New Hampshire; the Pequot War; British attacks on the New England coast during the Revolution; slavery in New England; Ethan Allen; the Ashburton Treaty, etc. (2) Similarly study some topic in local government assigned you, by consulting the town or city officers and your friends. (3) Make a study of some home industry assigned you. Discover what favored its establishment and growth. Describe its methods through the year; its tools and machinery; the raw materials; the products; and the related trade or commerce.

**TOPICAL STUDY OF A STATE.**— These topics may be used as the basis for a final review, or as a guide for more extended study.

I. *Physiography.* — (1) Position: state and show by drawings; advantages; boundaries, their history and causes. (2) Form: describe and draw. (3) Size: square miles, compared with states and countries; illustrative diagrams and maps. (4) Relief: character; history; effects on life; glacial forms; their distribution, formation, effects; sections of state. (5) Drainage: maps of the main divides; the larger river basins; the rivers; lakes and waterfalls, — character, cause, effects; uses of rivers and lakes. (6) Climate: temperature; winds; rainfall; seasonal changes; effects on industries; effects on people.

II. *Natural Resources.* — (1) Minerals: kinds; distribution; importance. (2) Forests: past and present distribution; value; preservation.

III. *People.* — (1) Settlement: history; character of settlers; character of later immigrants; causes and effects. (2) Population: past and present; rate of growth; distribution; changes in country and city. (3) Education: development of public schools; higher schools in the state; libraries. (4) Government: state constitution; its nature; state officers; duties; election. City and town governments.

IV. *Industries.* — (1) Development: pioneer conditions; early commerce; rise of manufacturing; means of communication. (2) List of industries. For every one, — its cause, development, location, importance; the raw materials, processes, and products; the sale of products.

V. *Cities and Towns.* — (1) Map. (2) Position, size, cause of location and growth, industries, characteristics, historic interest.

VI. *Review by Physiographic Sections.* — Their natural advantages, industries, and the character and distribution of the population.

## APPENDIX

### POPULATION OF THE NEW ENGLAND STATES: 1790 to 1900

POPULATION						
CENSUS YEARS.	MASS.	R.I.	CONN.	N.H.	MAINE.	VT.
1790 . . .	378,787	68,825	237,946	141,885	96,540	85,425
1800 . . .	422,845	69,122	251,002	183,858	151,719	154,465
1810 . . .	472,040	76,931	261,942	214,460	228,705	217,895
1820 . . .	523,159	83,015	275,148	244,022	298,269	235,966
1830 . . .	610,408	97,199	297,675	269,328	399,455	280,652
1840 . . .	737,699	108,830	309,978	284,574	501,793	291,948
1850 . . .	994,514	147,545	370,792	317,976	583,169	314,120
1860 . . .	1,231,066	174,620	460,147	326,073	628,279	315,098
1870 . . .	1,457,351	217,353	537,454	318,300	626,915	330,551
1880 . . .	1,783,085	276,531	622,700	346,991	648,936	332,286
1890 . . .	2,238,943	345,506	746,258	376,590	661,086	332,422
1900 . . .	2,805,346	428,556	908,355	411,588	694,466	343,841

PERCENTAGE OF INCREASE						
CENSUS YEARS.	MASS.	R.I.	CONN.	N.H.	MAINE.	VT.
1800 . . .	11.6	0.4	5.4	29.5	57.2	80.8
1810 . . .	11.6	11.3	4.3	16.6	50.7	41.
1820 . . .	10.8	7.9	5.	13.7	30.4	8.2
1830 . . .	16.6	17.1	8.1	10.3	33.9	18.9
1840 . . .	20.8	12.	4.1	5.6	25.6	4.
1850 . . .	34.8	35.6	19.6	11.7	16.2	7.5

CENSUS YEARS.	MASS.	R. I.	CONN.	N. H.	MAINE.	VT.
1800 . . .	23.7	18.4	24.	2.5	7.7	0.3
1870 . . .	18.3	24.5	16.8	—	—	4.9
1880 . . .	22.3	27.2	15.8	9.	3.5	0.5
1890 . . .	25.5	24.9	19.8	8.5	1.9	—
1900 . . .	25.2	24.	21.7	9.3	5.	3.3

QUESTIONS. — (1) Which state had the smallest population for many years? Which has now the fewest inhabitants? Explain this (pp. 77 and 98). (2) Which states had the greatest percentage of increase in population at first? Which after the middle of the last century? Explain this (pp. 19 and 22). (3) What portion of the total population was in Massachusetts in 1790? In 1900? Why the difference (p. 67)?

#### GROWTH IN POPULATION OF THE LARGEST CITIES.

	1900	1880	1860	1840	1820	1800
Boston . . .	560,892	362,839	177,840	93,383	43,298	24,937
Providence . .	175,597	104,857	50,666	23,171	11,767	7,614
Worcester . .	118,421	58,291	24,960	7,497	2,962	2,411
New Haven . .	108,027	62,882	39,267	12,960	7,147	4,049
Fall River . .	104,863	48,961	14,026	6,738	1,594	—
Lowell . . .	94,969	59,475	36,827	20,796	—	—
Cambridge . .	91,886	52,669	26,060	8,409	3,295	2,453
Hartford . . .	79,850	42,015	29,152	9,468	4,726	5,347
Bridgeport . .	70,996	27,643	13,299	3,294	1,500	—
Lynn . . . .	68,513	38,274	19,083	9,367	4,515	2,837
Lawrence . .	62,559	39,151	17,639	—	—	—
New Bedford .	62,442	26,845	22,300	12,087	3,947	4,361
Springfield .	62,059	33,340	15,199	10,985	3,914	2,312
Somerville . .	61,643	24,933	8,025	—	—	—
Manchester . .	56,987	32,630	20,107	3,235	761	—
Portland . . .	50,145	33,810	26,341	15,218	8,581	3,704
Salem . . . .	35,956	27,563	22,252	15,082	11,346	9,457

QUESTIONS. — (1) Salem is now the twenty-second city of New England in population. What was its rank in 1800? Why the difference



(p. 21)? (2) Compare the cities of coast and interior as to their growth. Review text on development of New England, and consider the reasons for the differences. (3) Contrast Boston and its suburbs, Cambridge and Somerville (p. 30). (4) Contrast Fall River and Lowell (pp. 52, 53); Hartford and Bridgeport; Portland and Manchester; New Bedford and Springfield. Find causes of differences.

## POPULATION OF CITIES AND LARGE TOWNS, 1900.

CITIES OF MASSACHUSETTS			
Beverly . . . . .	13,884	Andover . . . . .	6,813
Boston . . . . .	560,892	Arlington . . . . .	8,603
Brockton . . . . .	40,063	Athol . . . . .	7,061
Cambridge . . . . .	91,886	Attleboro . . . . .	11,335
Chelsea . . . . .	34,072	Barnstable . . . . .	4,364
Chicopee . . . . .	19,167	Belmont . . . . .	3,929
Everett . . . . .	24,336	Blackstone . . . . .	5,721
Fall River . . . . .	104,863	Braintree . . . . .	5,981
Fitchburg . . . . .	31,531	Brookline . . . . .	19,935
Gloucester . . . . .	26,121	Bridgewater . . . . .	5,806
Haverhill . . . . .	37,175	Canton . . . . .	4,584
Holyoke . . . . .	45,712	Chelmsford . . . . .	3,984
Lawrence . . . . .	62,559	Clinton . . . . .	13,667
Lowell . . . . .	94,969	Concord . . . . .	5,652
Lynn . . . . .	68,513	Dalton . . . . .	3,014
Malden . . . . .	33,664	Danvers . . . . .	8,542
Marlboro . . . . .	13,609	Dartmouth . . . . .	3,669
Medford . . . . .	18,244	Dedham . . . . .	7,457
Melrose . . . . .	12,962	Easthampton . . . . .	5,603
New Bedford . . . . .	62,442	Easton . . . . .	4,837
Newburyport . . . . .	14,478	Falmouth . . . . .	3,500
Newton . . . . .	33,587	Framingham . . . . .	11,302
North Adams . . . . .	24,200	Franklin . . . . .	5,017
Northampton . . . . .	18,643	Gardner . . . . .	10,813
Pittsfield . . . . .	21,766	Grafton . . . . .	4,869
Quincy . . . . .	23,899	Great Barrington . . . . .	5,834
Salem . . . . .	35,956	Greenfield . . . . .	7,927
Somerville . . . . .	61,643	Hingham . . . . .	5,059
Springfield . . . . .	62,059	Hudson . . . . .	5,454
Taunton . . . . .	31,036	Hyde Park . . . . .	13,244
Waltham . . . . .	23,481	Ipswich . . . . .	4,658
Woburn . . . . .	14,254	Lee . . . . .	3,506
Worcester . . . . .	118,421	Lenox . . . . .	2,942
TOWNS — MASSACHUSETTS		Leominster . . . . .	12,392
Abington . . . . .	4,489	Lexington . . . . .	3,831
Adams . . . . .	11,134	Mansfield . . . . .	4,006
Amesbury . . . . .	9,473	Marblehead . . . . .	7,582
Amherst . . . . .	5,028	Methuen . . . . .	7,512
		Middleboro . . . . .	6,885
		Milford . . . . .	11,376



Litchfield . . . . .	3,214
Litchfield, borough . . . . .	1,120
Manchester . . . . .	10,601
Meriden . . . . .	28,695
Meriden, city . . . . .	24,296
Middletown . . . . .	17,486
Middletown, city . . . . .	9,589
Milford . . . . .	3,783
Naugatuck, borough . . . . .	10,541
New Britain . . . . .	28,202
New Britain, city . . . . .	25,998
New Haven, city . . . . .	108,027
New London, city . . . . .	17,548
New Milford . . . . .	4,804
Norwalk . . . . .	19,932
Norwalk, city . . . . .	6,125
So. Norwalk, city . . . . .	6,591
Norwich . . . . .	24,637
Norwich, city . . . . .	17,251
Orange . . . . .	6,995
West Haven, borough . . . . .	5,247
Plainfield . . . . .	4,821
Portland . . . . .	3,856
Putnam . . . . .	7,348
Putnam, city . . . . .	6,667
Seymour . . . . .	3,541
Southington . . . . .	5,890
Southington, borough . . . . .	3,411
Stafford . . . . .	4,297
Stafford Springs . . . . .	2,460
Stamford . . . . .	18,839
Stamford, city . . . . .	15,997
Stonington . . . . .	8,540
Stonington, borough . . . . .	2,278
Stratford . . . . .	3,657
Thompson . . . . .	6,442
Torrington . . . . .	12,453
Torrington, borough . . . . .	8,360
Vernon . . . . .	8,483
Rockville, city . . . . .	7,287
Wallingford . . . . .	9,001
Wallingford, borough . . . . .	6,737
Waterbury . . . . .	51,139
Waterbury, city . . . . .	45,859
Westport . . . . .	4,017
Winchester . . . . .	7,763
Winsted, borough . . . . .	6,804
Windham . . . . .	10,137
Willimantic, city . . . . .	8,937
Windsor . . . . .	3,614

## CITIES OF NEW HAMPSHIRE

Berlin . . . . .	8,886
Concord . . . . .	19,632
Dover . . . . .	13,207
Franklin . . . . .	5,846
Keene . . . . .	9,165
Laconia . . . . .	8,042
Manchester . . . . .	56,987
Nashua . . . . .	23,898
Portsmouth . . . . .	10,637
Rochester . . . . .	8,406
Somersworth . . . . .	7,023

## TOWNS—NEW HAMPSHIRE

Bethlehem . . . . .	1,261
Claremont . . . . .	6,498
Conway . . . . .	3,154
Derry . . . . .	3,583
Exeter . . . . .	4,922
Farmington . . . . .	2,265
Goffstown . . . . .	2,528
Haverhill . . . . .	3,414
Hillsboro . . . . .	2,254
Lancaster . . . . .	3,190
Lebanon . . . . .	4,965
Lisbon . . . . .	2,221
Littleton . . . . .	4,066
Milford . . . . .	3,739
Newmarket . . . . .	2,892
Newport . . . . .	3,126
Pembroke (Suncook) . . . . .	3,183
Peterboro . . . . .	2,527
Pittsfield . . . . .	2,129
Plymouth . . . . .	1,972
Salem . . . . .	2,041
Walpole . . . . .	2,693
Winchester . . . . .	2,274
Wolfboro . . . . .	2,390

## CITIES OF MAINE

Auburn . . . . .	12,951
Augusta . . . . .	11,683
Bangor . . . . .	21,850
Bath . . . . .	10,477
Belfast . . . . .	4,615
Biddeford . . . . .	16,145
Brewer . . . . .	4,835

Calais . . . . .	7,655	Rumford . . . . .	3,770
Eastport . . . . .	5,311	St. George . . . . .	2,206
Ellsworth . . . . .	4,297	Sanford . . . . .	6,078
Gardiner . . . . .	5,501	South Berwick . . . . .	3,188
Hallowell . . . . .	2,711	Skowhegan . . . . .	5,180
Lewiston . . . . .	23,761	Thomaston . . . . .	2,688
Old Town . . . . .	5,763	Vinal Haven . . . . .	2,358
Portland . . . . .	50,145	Waldoboro . . . . .	3,145
Rockland . . . . .	8,150	Winslow . . . . .	2,277
Saco . . . . .	6,122	Yarmouth . . . . .	2,274
South Portland . . . . .	6,287	York . . . . .	2,668
Waterville . . . . .	9,477		
Westbrook . . . . .	7,283		

## CITIES OF VERMONT

Barre . . . . .	8,448
Burlington . . . . .	18,640
Montpelier . . . . .	6,266
Rutland . . . . .	11,499
St. Albans . . . . .	6,239
Vergennes . . . . .	1,753

## TOWNS — VERMONT

## TOWNS — MAINE

Berwick . . . . .	2,280
Bridgton . . . . .	2,868
Bristol . . . . .	2,572
Brunswick . . . . .	6,806
Bucksport . . . . .	2,339
Camden . . . . .	2,825
Caribou . . . . .	4,758
Chelsea . . . . .	3,092
Dexter . . . . .	2,941
East Livermore . . . . .	2,129
Eden (Bar Harbor) . . . . .	4,379
Fairfield . . . . .	3,878
Farmington . . . . .	3,288
Fort Fairfield . . . . .	4,181
Fort Kent . . . . .	2,528
Freeport . . . . .	2,339
Gorham . . . . .	2,540
Hampden . . . . .	2,182
Houlton . . . . .	4,686
Jay . . . . .	2,758
Jonesport . . . . .	2,124
Kennebunk . . . . .	3,228
Kennebunkport . . . . .	2,123
Kittery . . . . .	2,872
Lisbon . . . . .	3,603
Lubec . . . . .	3,005
Madison . . . . .	2,764
Norway . . . . .	2,902
Orono . . . . .	3,257
Paris . . . . .	3,225
Pittsfield . . . . .	2,891
Presque Isle . . . . .	3,804
Rockport . . . . .	2,314

Barre . . . . .	3,346
Barton . . . . .	2,790
Bennington . . . . .	8,033
Brandon . . . . .	2,759
Brattleboro . . . . .	6,640
Colchester (Winooski) . . . . .	5,352
Derby . . . . .	3,274
Essex . . . . .	2,203
Fair Haven . . . . .	2,999
Hardwick . . . . .	2,466
Hartford . . . . .	3,817
Lyndon . . . . .	2,956
Middlebury . . . . .	3,045
Morristown . . . . .	2,583
Newbury . . . . .	2,125
Newport . . . . .	3,113
Northfield . . . . .	2,855
Poultney . . . . .	3,108
Proctor . . . . .	2,136
Randolph . . . . .	3,141
Rockingham (Bellows Falls) . . . . .	5,809
Richford . . . . .	2,421
St. Johnsbury . . . . .	7,010
Springfield . . . . .	3,432
Swanton . . . . .	3,745
Waterbury . . . . .	2,810
West Rutland . . . . .	2,914
Woodstock . . . . .	2,557





